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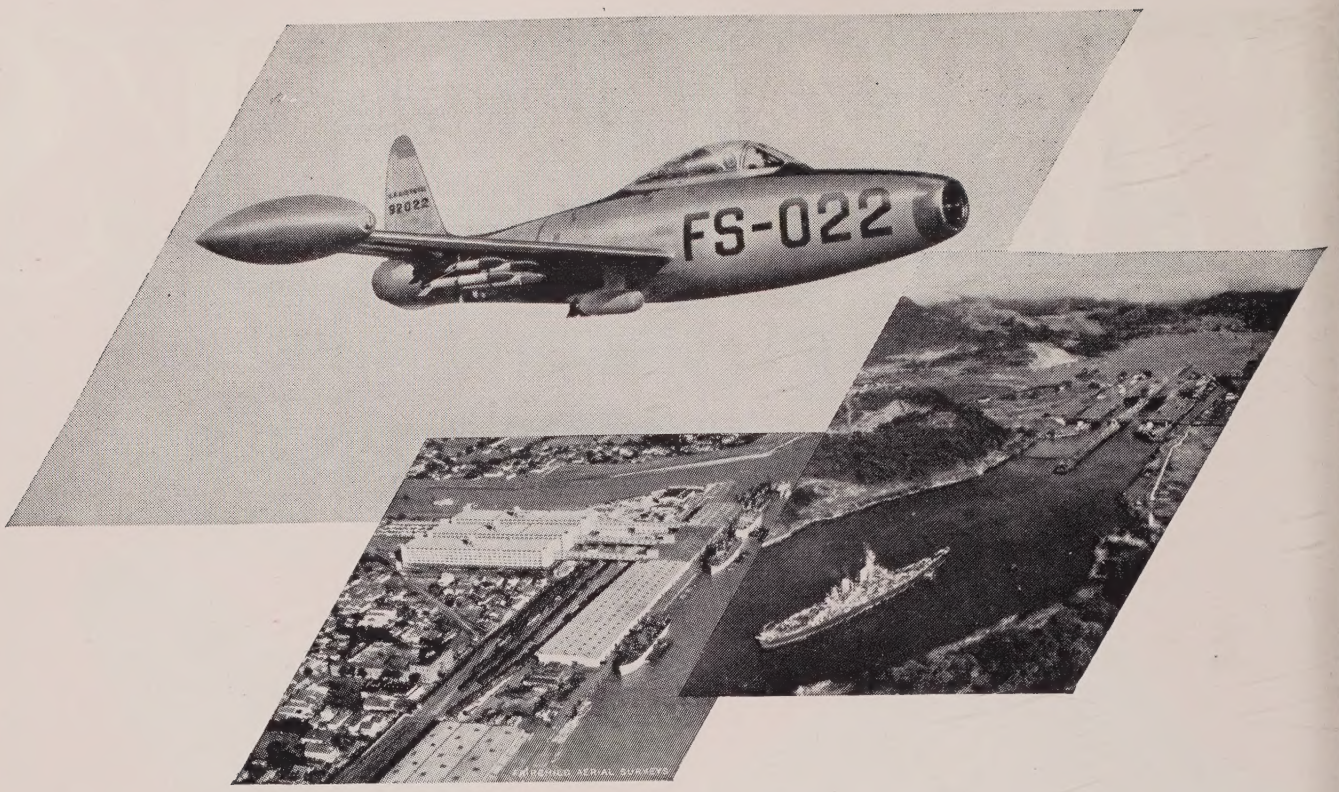

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Coming Up... in SKYWAYS

Here comes November when, in many sections of the country, the hint of fall becomes a winter reality. November is the time for a change in grade of oil for that airplane, a winter grease job . . . and perhaps another look at your charts in the hope of an aerial junket to warmer climes. Many a pilot maintains fall and winter months offer the best flying in almost all parts of the U. S. In between your air jaunts, here's what . . .

SKYWAYS' November issue features:

● **"High-Speed Stalls,"** by Dana *Crawford.* An airplane can be stalled at any speed. A test pilot for Douglas once stalled an SBD dive bomber while going straight down at a speed approaching 300 mph! Another test pilot stalled an F-80 at 400 mph! But high-speed stalls aren't restricted to high-speed aircraft . . . any pilot in any airplane can build up an "accelerated stall" at a speed way above the plane's given stalling point. In this article, Dana Crawford reports on the causes of high-speed stalls and how to keep away from them.

● **"Arctic Research—USN,"** *by Adm. Lonnquest.* One of the prime projects of the United States Navy is plane operation and maintenance and pilot performance under the arctic regions' sub-sub-zero conditions. Admiral Lonnquest discusses the Navy's current program of Arctic Research.

● **"Pilot's Report — New Cessna 140,"** *by Don Downie.* Pilots and plane owners will want to read this detailed report of the operation and performance of Cessna's new two-place 140.

● **"Plane Care,"** *by Bill Odom.* A well cared for and properly maintained airplane will give its owner greater utility and more economical operation. In this article Bill Odom reports on good aircraft maintenance and how the plane owner can make sure his ship is in good order . . . for better performance.

These and many other articles of pilot and plane-owner interest are featured in SKYWAYS

November Issue

SKYWAYS

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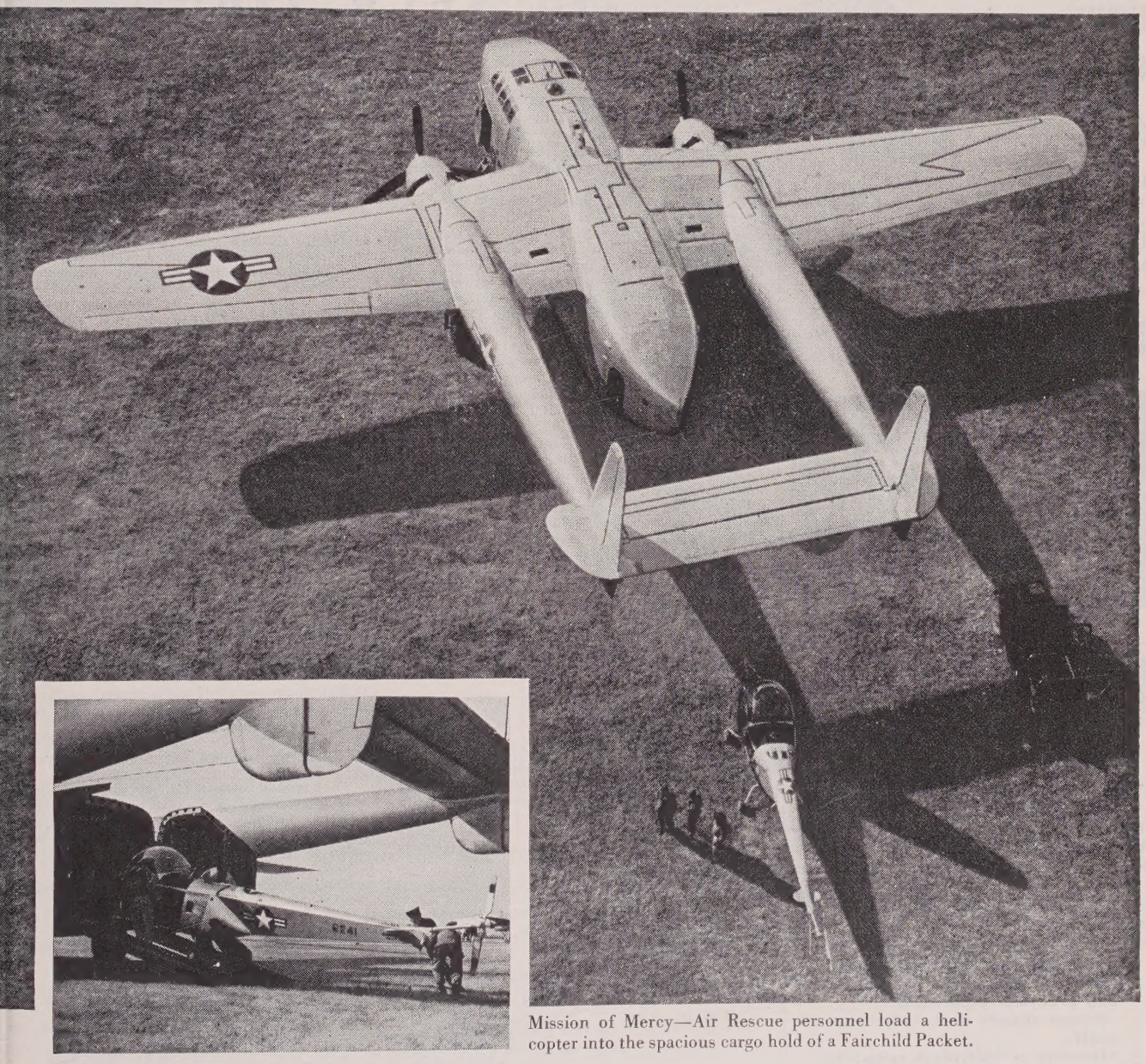

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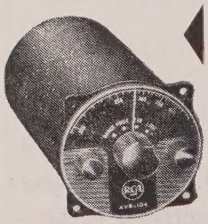

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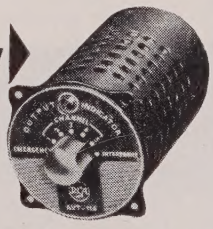

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AIR YOUR VIEWS

Mooney Mite

Gentlemen:

In your August issue, Mr. Downie writes a report on the Mooney *Mite*. He says that the *Mite* is difficult to crank. This isn't true if the following procedure is utilized:

Stand on the right side of the ship at the leading edge of the wing, and spin the prop with the right hand.

The next trouble Mr. Downie had was with the gear handle. This, too, was unnecessary. Apparently he wasn't properly briefed in its use. The easiest method is to reach forward with the right hand, thumb pointed down. This means the palm of the hand will face out. Then grasp the handle, unlock, and up the gear, and then lock into the "up" position.

If you do it this way, there is no chance of skinning the hands nor is it necessary to change position to lock the gear either up or down.

By the way, the *Mite* that I fly indicates 115 mph at a temperature of 87° and climbs 1000 feet in a minute. There sure should be some provision made for ventilating the cockpit.

The ship I fly has a small Plexiglas window in the nose-wheel well through which a visual landing check of the gear can be made.

The baggage space is limited, but the overall economy of the *Mite* should make it a popular salesman's plane.

R. S. KRAFSKI

Hillside, N. J.

Thanks, Mr. Krafski, for your "tips" on the Mooney Mite. *We'll pass your words of wisdom on to our test pilot Don Downie.*—ED.

What d'ya mean "We"

Gentlemen:

Maybe you fellows can set me straight on this . . . regarding Don Downie's fine report on the Mooney *Mite*, where does he get that "we" business? Who besides himself went with him on his pilot's report flight . . . it's a one-placer, isn't it?

R. D. PLAMBECK

San Francisco, Calif.

No one rode with Pilot Downie. Author Downie was merely exercising his right to use the so-called editorial "we."—ED.

FH-1 or F2D-1

Gentlemen:

I may be wrong but that FH-1 on page 33 of the August issue looks a lot like an F2D-1. Is it?

BILL O'NEIL

Richfield, Minn.

No, not exactly. The FH-1 was formerly designated as the FD-1. Navy changed the designation to FH-1. The F2D-1 is now known as the F2H-1. These jets are built by McDonnell Aircraft, and the FH-1 is the Phantom *while the F2H-1 is the* Banshee.—ED.

Open Cockpit

Gentlemen:

In your August issue you showed a picture of an FH-1 jet which was in the process of taking off . . . and with the cockpit open. Isn't that dangerous?

E. BROWN
D. DELANEY

Rankin, Texas

Taking off with the cockpit hatch open isn't S.O.P. as far as the USAF is concerned, but one Navy pilot tells us that most Navy flyers do . . . probably so that they can see the deck signal officer better. Anyway, because they do it that way when operating from carriers, they follow the same procedure when operating from land bases. As far as the photo you speak of is concerned, Marine officers report the pilot was just taxiing into take-off position when the cameraman took the picture. The pilot himself reports he got sand and dirt in the eyes. Maybe he'll keep the hatch closed from now on.—ED.

Swift Info

Gentlemen:

What company makes the Swift 125?

B. GITTINGS

Elmwood, Ill.

The Swift 125 is made by Texas Engineering and Manufacturing Company, called Temco, of Grand Prairie, Texas.—ED.

Weather Maps

Gentlemen:

Are subscriptions to official U. S. Weather Bureau maps available to interested individuals? If so, would you please tell me how to obtain such a subscription.

JERROLD H. MARTIN

East Liverpool, Ohio

The printed official U. S. Weather Bureau map is available on a subscription basis. Daily, including Sunday and holidays, are available for $3.60 a year. Make out a check or money order to Treasurer of United States, and mail it, along with your application for the daily weather maps, to Chief, U. S. Weather Bureau, Washington 25, D. C.—ED.

B-39 and B-40

Gentlemen:

I would like to know if there was a plane known as the B-39 and B-40, and also if they are still using the P-40 and Bell *Airacuda*.

FRED ZELLARS, JR.

Dayton, Ohio

There was an XB-39-GM built by General Motors. Actually, this ship was a YB-29 converted by General Motors and powered by four Allison engines instead of the Wrights. There also was an XB-40-VE and a YB-40-VE. These were B-17's converted by Vega to escort. Neither the XFM-1 Airacuda *or the P-40 are in use by the AF now. Only 13* Airacudas *were built.*—ED.

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MILITARY AVIATION

Jet Attack Bomber for Navy

Cancellation of the Navy's plans for a super-carrier has caused a revision of plane plans. Study is now in the direction of a lightweight turbo-powered attack bomber to operate off *Midway*-class carriers. Curtiss-Wright and Douglas are doing the preliminary design studies for the Navy's hoped-for turbojet-powered 65,000 pound attack bomber.

X Series

According to word from Bell Aircraft Corp., Buffalo, N. Y., the X-2 rocket-powered swept-wing stainless steel research plane is scheduled to make its first hop next January. Designed to explore the transonic speed range between Mach .9 and Mach 2, the X-2 is powered by a rocket engine developed by Curtiss-Wright Corporation.

B-36 or?

In connection with the argument over the Convair B-36, an aircraft engineer with no axe to grind offers these comparisons in the staged "battle" between the AF B-36 and the Air Navy's F2H-2.

Top speed:	B-36—	372 mph at 42,000 ft.
	F2H-2—	630 mph at 30,000 ft.
		562 mph at 40,000 ft.
		547 mph at 42,000 ft.
Mach limit:	B-36—	.68
	F2H-2—	.85
Ceiling:	B-36—	47,500 ft.
	F2H-2—	48,000 ft.
Rate of climb:	B-36—	700 fpm (sea level)
	F2H-2—	9,000 fpm (sea level)

If the "battle" ever comes off, we'll post you on the results.

New T-6

The 1950 model of the well-known military trainer, the *Texan*, has been announced by North American. The new "6" has been modernized and re-equipped. Range of the trainer has been upped to over 1,000 miles; the cockpit has been simplified, with the gauges arranged on a tilted panel for easy looking; the rear cockpit contains controls for complete instrument flight training; and radio and electronic equipment has been brought up-to-date so that the T-6 now has a VHF command set, range receiver, marker beacon receiver, interphone system, radio compass and instrument landing system. Another improvement is the steerable tail wheel.

Cost Trends

A report from the Aircraft Industries Association shows that despite higher performance and more costly materials and production, the cost trend of new military planes delivered to the Gov't has been held far below to general price rise since 1940.

Using a typical fighter plane as an example, the AIA reports that a typical fighter plane manufacturer built a fighter at a cost of $13.29 per airframe pound in 1940. Today's fighter is produced at a cost of $15.16 per pound, less than 20 per cent above prewar, despite the fact that costs and prices generally are 100 per cent higher than prewar.

Reserve Airmen Recalled

The Air Force announced provisions for the voluntary recall of enlisted Reservists who will be returned to active duty to fill vacancies. The number of personnel recalled will be dependent upon the vacancies in the USAF. Assignments can be made in all Air Force commands in the U. S., and in over-seas areas where duty tours permit.

New Pitot Tube

A high-speed pitot tube for use on military aircraft is in production at the G. M. Giannini & Company, Inc., of Pasadena, California. Designer of the instrument was North American Aviation, and production is under license to Giannini.

Seat-Ejection Bail-Outs at 555 mph

Recent tests, conducted over San Pablo Bay near Hamilton Air Force Base, San Rafael, California, proved that seat-ejection bail-outs of personnel from a jet plane flying at more than 555 mph are entirely successful. Captain Vincent Mazza, of Naperville, Illinois, and Staff Sergeant Victor A. James, Newcastle, Pennsylvania, volunteered for the series of seat-ejection tests. These bail-out tests were made at various speeds. Capt. Mazza was shot clear of the plane at speeds of 530 and 550 mph, while Sgt. James completed a seat-ejection bail-out at an air speed of 405 mph. The bail-outs took place at an altitude of 10,000 feet. Both Capt. Mazza and Sgt. James reported they felt no ill effects from the sudden acceleration at the instant of the seat's ejection from the plane.

Super Flying Boat

The first of two experimental XP5Y-1 Navy patrol flying boats is nearing completion at the San Diego plant of Consolidated Vultee. This 60-ton aircraft was designed for long-range day and night search and rescue operations and anti-sub patrol. It is powered by four Allison prop-jet engines. Flight tests are scheduled for October or November.

Northrop XF-89

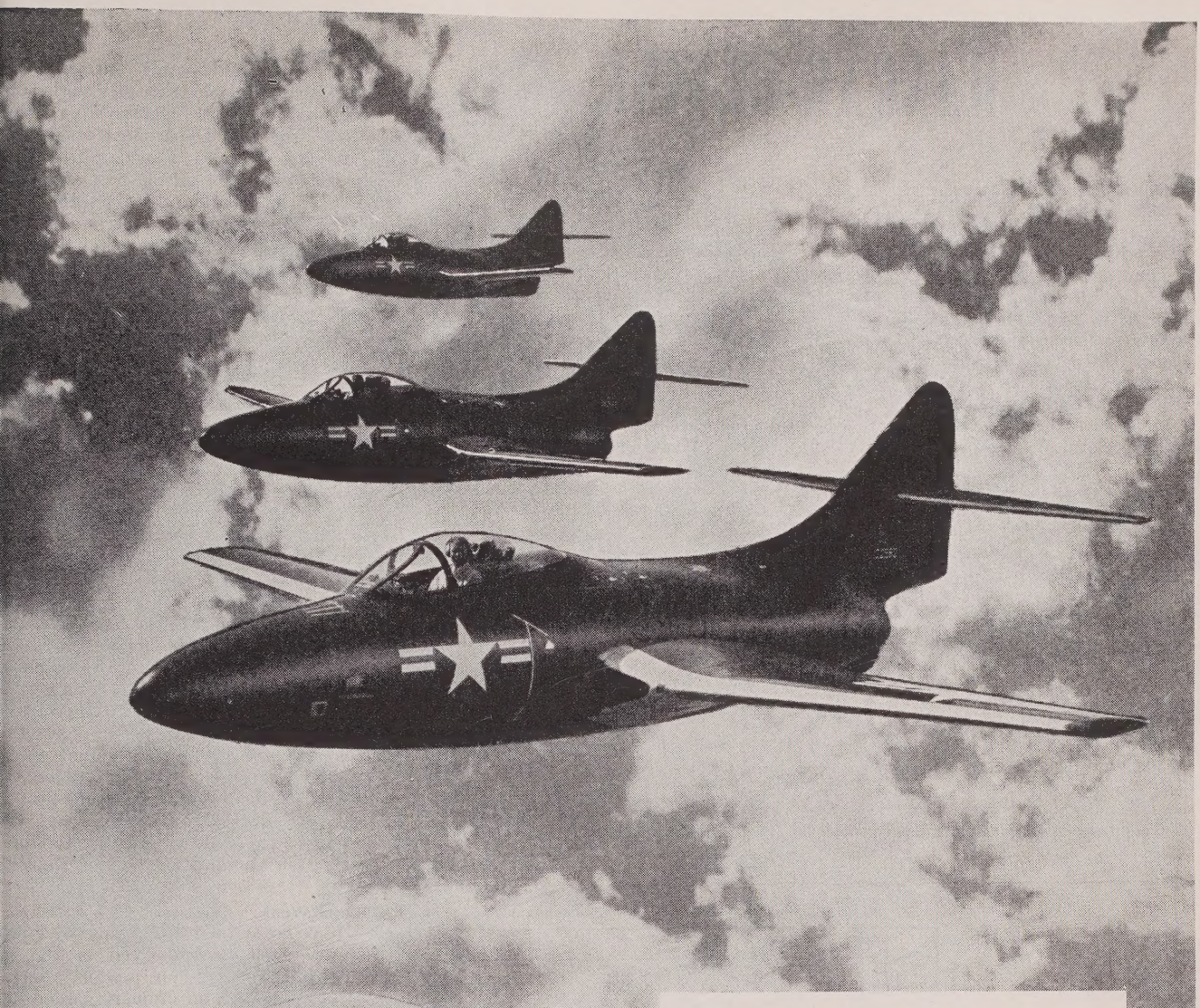
Production version of the twin-jet night fighter built by Northrop will be powered by two GE J-47 turbojets. The experimental XF-89 employs Allison J-35 engines. Negotiated cost of an F-89, according to USAF contract is $800,000. The initial order calls for 48.

Fund Transfer

That portion of the Navy's budget that was ear-marked for the construction of the 65,000-ton carrier, *United States*, has been transferred to a category called, "renovation of two 27,000-ton carriers to accommodate new plane types." The Senate Appropriations Committee recently approved this transfer of funds.

Fiberglas 'Copter Blades

The Cornell Aeronautical Laboratory has developed fiberglas helicopter blades that thus far have proved aerodynamic and structural superiority over several conventional type blades. The fiberglas blades are 22 feet long and have an average width of 20 inches. Tests are currently being made at Wright-Patterson Air Force Base, Dayton, Ohio.



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HANGAR FLYING

Private Plane Seat Covers

Seat covers for automobiles have been popular for years an' years. And now it's the private plane's turn to enjoy such equipment. A recent announcement from The Fry Products Company of Detroit informs us of its development of lightweight nylon seat covers for private planes. Made of a washable material developed by Burlington Mills Corp., the seat covers can be put on or taken off in from seven to 10 seconds, and are easy to keep clean.

Flying Farmers of Calif.

The fourth annual meeting of the Flying Farmers of California will be held September 9th and 10th. This will be the first meeting the Flying Farmers have held since the University of California purchased the University Airport, and it is expected that over a hundred members will fly in for the get-together.

Temco Swift for 1950

Texas Engineering & Manufacturing Company, Inc., is test flying its proposed 1950 model Temco *Swift*. Designated the TE-2A, it is powered by 145-hp Continental engine and is an outgrowth of the development of the TE-1A military trainer offered to the Gov't by Temco. The TE-2A, however, will be a side-by-side ship and not a tandem type as was the TE-1A. If engineering tests are favorable and if market studies indicate good possibilities for the new model, Temco may put it into production. Preliminary cost estimates indicate the TE-2A will have to be sold for close to $6,500 as compared to the $4,495 of the present 125-hp *Swift*.

Motion Pictures Available

Shell Oil Company is making educational films available to schools, clubs, churchs, youth groups, fraternal organizations and any other responsible group possessing a 16-mm sound projector. In addition to a series of films on the discovery and production of oil, Shell offers several films on aviation. One in particular is called "How An Airplane Flies," and it is one of the best we've seen. There are six reels covering "Lift," "Drag," "Thrust," "Forces in Balance," "Stability," and "Controls." Total running time is about one hour.

If some club or organization to which you belong is interested in a listing of Shell films, write us and we will turn your request over to the proper party at Shell Oil's executive offices.

	Complete Aircraft			Manufacturer's Net Billing Price		
	Shipments			Shipments		
	TOTAL Jan-Jun	June	May	TOTAL Jan-Jun	June	May
				(thousands of dollars)		
Aeronca						
Champion 65 hp	1	--	--			
Champion 85 hp	13	2	4			
Chief 65 hp	1	--	--			
Superchief 85 hp	11	1	1	611	57	185
Sedan	133	13	39			
7CCM a/	65	2	25			
Beech - Bonanza	154	35	35	1,418	325	325
Bellanca - Cruisair	26	1	6	138	5	33
Cessna						
120	5	--	1			
140	38	--	1			
140A	56	39	17			
170	292	38	59	2,780	486	413
190	10	3	2			
195	104	16	7			
Engineering & Research						
Model E	5	1	1			
Model G	30	8	6	113	30	23
Luscombe						
8A	39	6	6			
8F	103	18	31	417	62	94
Sedan	15	1	1			
Mooney - M-18L	30	10	10	54	18	18
Piper						
Cub Special	174	29	34			
Supercruiser	1	--	--			
Family Cruiser	24	4	1			
Vagabond	44	15	6	1,907	472	429
Clipper	405	145	129			
Stinson	103	7	9			
Ryan - Navion	146	16	17	1,213	133	142
Taylorcraft						
BC12D-85	15	5	3			
BC12D-65	4	--	1	36	10	8
Texas Engineering - Swift	34	9	5	114	30	17
TOTAL	2,081	424	457	8,801	1,628	1,687

a/ Military type aircraft sold to other than U.S. Military customers

CHART reports shipment of 424 personal planes by 11 companies during the month of June

Flying Facts

If you're anticipating an aerial jaun to Canada, don't take off until you've procured a copy of "Ontario Flying Facts 1949" from the Department of Travel & Publicity, Toronto, Canada. This handy booklet gives you all the best airport and airways information for the province of Ontario. It also passes out good info on customs and immigration regulations. The booklet is free.

Piper Liaisons

A contract to build 105 liaison planes for the USAF has been awarded Piper Aircraft. Designated as L-18-B, the Piper liaison is a two-place, tandem, high-wing monoplane powered by 65-hp Continental engine. The ship will come off the assembly line painted olive drab. These L-18-B's are slated to be shipped to the Turkish Gov't for use as training aircraft in the Turkish Air Force.

Lear Omnitenna

Lear, Incorporated, well-known radio equipment builders in the field of aviation, has come up with an unique installation of the antenna for the Lear Omnimatic VHF equipment. Called "Omnitenna," it is mounted on the vertical stabilizer of an airplane, thus blending the receiver dipole antenna with the streamline contour of the ship itself. VHF reception continues excellent with this hook-up. The idea was devised by Lynn Brown, radio expert of Long Beach Airport, California, for a Lear Omnimatic-equipped *Navion*.

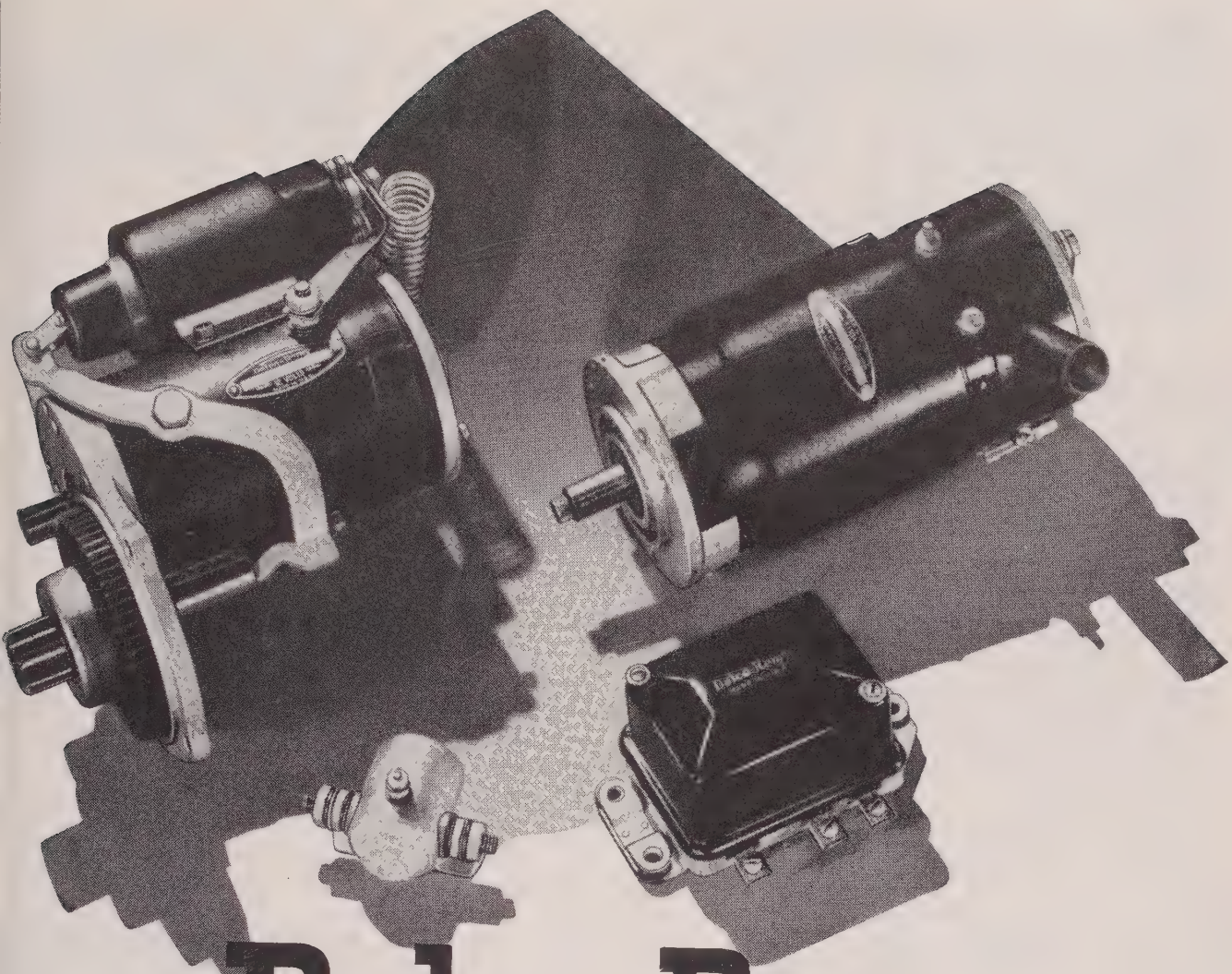
Plane Wash

If you're a bug on keeping your plane clean, you'll be interested in the new "Sudzit," a spray-gun product designed to be used with an ordinary garden hose. With this gadget, planes of all sizes and types can be washed, lathered and rinsed all in one speedy operation. The "Sudzit" kit contains a bottle of concentrate detergent (which provides the cleansing suds), an applicator bottle which screws on under the "Sudzit" hose nozzle for operation.

Skytourists

A few years ago an organization called "Skytours, Inc." was founded by two avid personal-plane travelers. Purpose of the organization is to provide, for a nominal fee, a set-up for the plane owner similar to that provided the auto traveler by AAA. The fact that Skytours, Inc. is successful is proved by the growing list of members subscribing to its service. Members belonging to this organization are supplied a "Directory" of resorts, hotels, etc., that are accessible by private plane and that cater to the private-plane owner. The resort or hotel that bears the "Skytour" emblem is one that maintains rigid standards set for it under the Skytour arrangement. In many cases, special rates are given to Skytour members, and in all cases members are particularly welcomed to these vacation spots, hotels, etc.

Dues for membership in Skytours are $15 a year, and if you want to get more out of your plane and really use it for travel and transportation, you'll do well to investigate membership in this organization located at Swarthmore, Pa.



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PROP WASH

Aero Oddities

Talked Down. During an aerobatic exhibition, a National Guard pilot flying an F-51 snapped his head and neck into a paralyzing position. Unable to see the ground, or to move his head up or down or sideways, the F-51 pilot fought off unconsciousness, brought his plane out of a stall, then was talked down to a successful landing via radio by three buddies flying in formation with him. *(Terrance Kay, San Francisco, California)*

Air Conditioning. A Benedict, Nebraska farmer has figured out a way to air condition his hay field and make it more workable in the sizzling temperatures. Flying Farmer Lowell Dickson anchors his small plane at the edge of his hay field, starts the engine, then lets the prop sweep the field with a cooling breeze. *(Z. Thomas, West Philadelphia, Pa.)*

Charged Atmosphere. While a North American test pilot was taxiing a fighter plane off the runway at Los Angeles Municipal Airport, the ship's canopy flew off, aided by the gunpowder charge that is wired to throw it clear of the plane in flight. Automatically in the same circuit, the pilot's seat is supposed to follow the canopy with enough force to throw the pilot, his chute and seat 60 feet into the air. Fortunately, the circuit malfunctioned. Had it worked as it was supposed to, however, the pilot would have been fired 60 feet into the air from his slow-taxiing airplane! *(Don Downie, Pasadena, California)*

Aerial Bandits. Recently two Georgia men were arrested and sent to jail for stealing hogs by plane. Their procedure had been to fly to St. Catherine's Island, steal hogs, kill them, load them into plane and fly them back to Harris Neck, Georgia, where they were dressed and sold. *(W. F. Dillard, Jr., Hamlet, N. C.)*

Duplication. Recently man purchased an *Ercoupe*, license number "NC 2100H". When son, 20 years old, saw that license, he went home, rummaged around attic, and came out with toy American Airlines Flagship he had been given 10 years ago. It bore license, "NC 2100!" *(James E. Rainer, Grand Rapids, Mich.)*

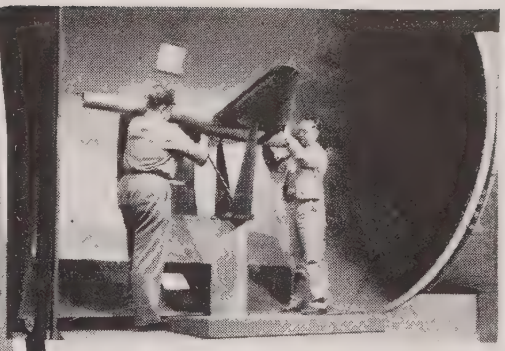
Not S.O.P. While flying out of Naval Air Station at Glenview, Illinois, one of the pilots had to bail out when his ship lost prop and vibration tore out engine. When asked about accident later, pilot insisted he was not scared, but when other pilots asked if he'd dived out of disabled plane head first, the brave one replied, "I climbed over the side, hung by my fingers, then finally dropped." *(John W. Glover, Lubbock, Texas)*

Pass Signal. While coming into an airport at end of his first ride in an airplane – and one with retractable gear – a man strained against his safety belt when he heard the gear warning horn, and yelled to the pilot, "Get the devil over . . . can't ya hear? Someone wants to pass us!" *(S. S. Wise, Claytonville, Ill.)*

Att'n Readers:

If you have any news note oddities pertaining to aviation, send them to SKYWAYS, Box 17, 444 Madison Avenue, New York 22, N. Y. Five dollars will be paid the sender of each "oddity" printed. Contributions cannot be returned unless accompanied by stamped addressed envelope. The decision of the editors is final.

There's a Big Future for YOU in AERONAUTICAL ENGINEERING —with NORTHROP Training



Aeronautical Engineering offers you a wide choice of creative and practical duties. Here two engineers install a guided missile model in the Northrop Aircraft, Inc. wind tunnel to study its aerodynamic characteristics.

Write your own ticket for earnings and achievement—in *Aeronautical Engineering*. Ride to success on wings of the great *Air Age*. *Aviation* is progressing at "super-sonic" speed. Things to come defy your imagination. Stretching ahead of you can be a lifetime career of fascinating work and rich rewards.

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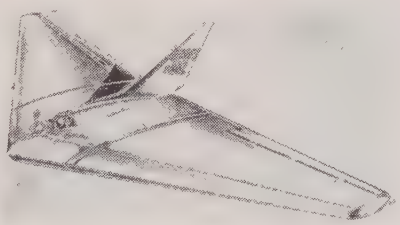
In a huddle on their design for the rudder of a student project aircraft, these Northrop students study their assembly drawings—a scene they will repeat many times during their careers.

Wing-top classroom—an example of how engineering instruction at Northrop comes vividly to life in an actual aviation industry environment.



All-wing glider designed by Northrop engineering students—a typical training project for practical design and production experience.

NORTHROP TRAINING HAS WON CHOICE JOBS FOR GRADUATES

Many of even the more recent *Northrop* graduates are in such important specialized work as design, research, testing, stress analysis, aerodynamics, and power plant engineering. Helicopter and guided missile design are examples of the advanced projects for which *Northrop* graduates have been chosen.

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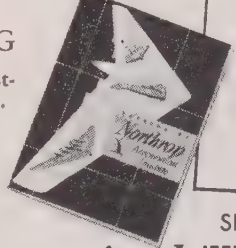

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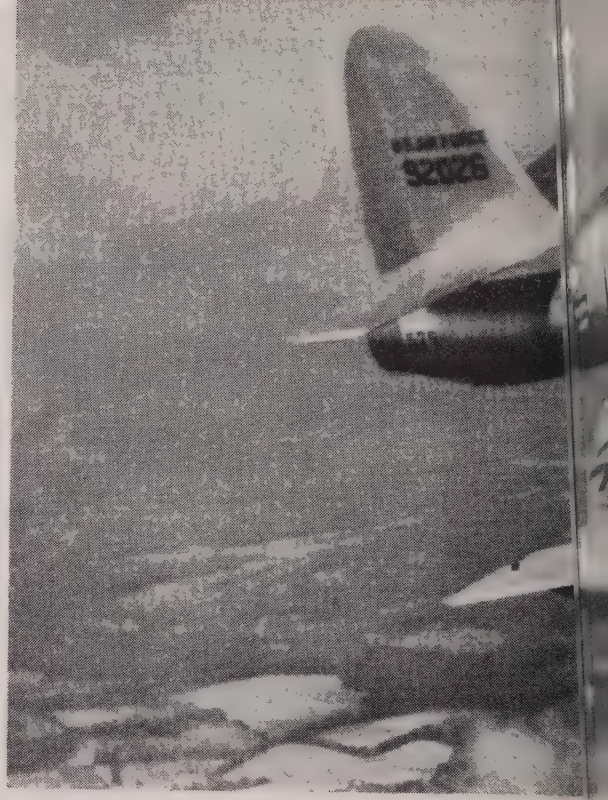
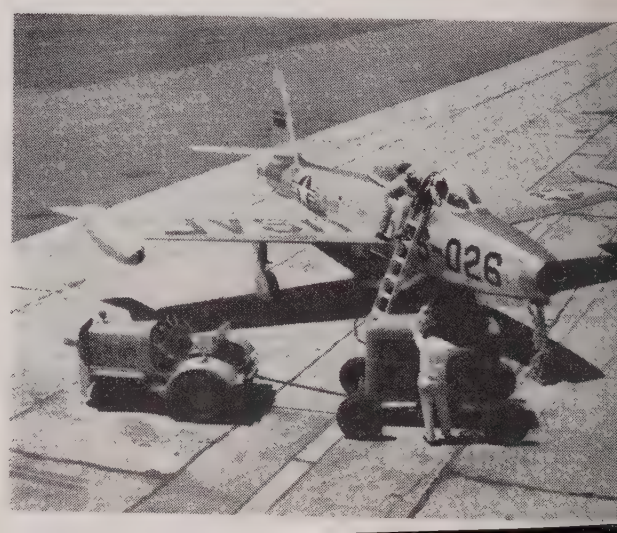


USAF's New F-84-E

By JERRY LEICHTER

MODEL E of the *Thunderjet* line features increased speed and range. Aerodynamic fins on ship's wing-tip tanks *(left)* enable F-84-E to go through high-speed combat maneuvers under load conditions. Wing can take 14 G's



THE oldest argumentative question in aviation is "What will it do?"

Raised to a frenzy by the touchy controversy of jet fighters versus The Bomber, aviation enthusiasts have seemingly set a new false standard for jet-fighters performance, "Will it knock down a B-36?"

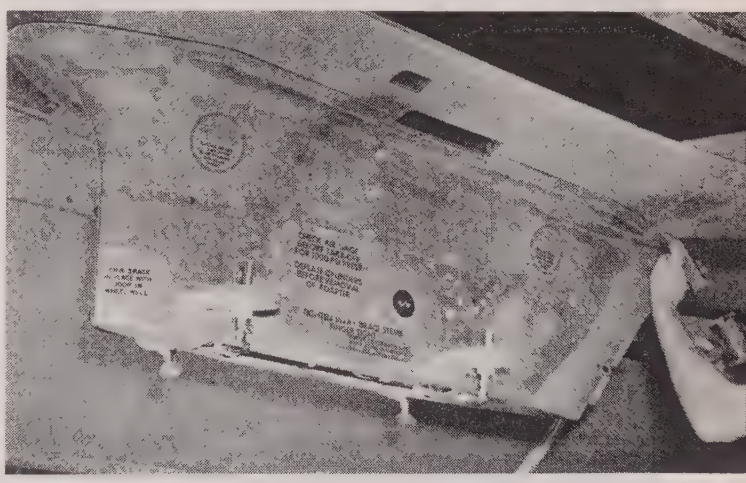
Apparently the bitter fight over present aircraft performance has obscured the technological reasons that may make a plane invulnerable one year and obsolete the next.

The military aircraft flying today are the products of experimental engineering advances tailored to specific military requirements. When staff planners sit down with production experts to work out a contract for a new aircraft, the specifications are determined by the powerplant that will be available for use when the airframe is ready to receive it, and by the armament it is intended to carry for a specific task or tasks.

Prototype performance characteristics are geared to the limits of powerplant and airframe design and to the type of materials and processes available at that time, but while the prototype may be frozen for the production of service aircraft, the engineers are continually planning improvements for future versions of the same plane as long as it has not been made obsolete by reason of new tactical considerations and limitations in the original design.

While it is obvious *(Continued on page 45)*

ARMAMENT on the F-84 consists of six M-3 .50-caliber guns, two jettisonable pylon-type bomb racks *(below)* and four retractable rocket launchers for four five-inch HVAR's



NEW ITEM on the F-84-E is the battery hoist *(below)* which provides ready accessibility to the plane's batteries

HOLIDAY ON WINGS

BONANZA belonging to Mr. and Mrs. Arthur Otis is taxied up to administration building at airport at Tampico, Mex.

HANGARS at Mexico City's airport are located across an arterial highway. Traffic is stopped to let the ships cross

By ARTHUR R. OTIS

HOME to the Otis family is Wilderness Airport in Minnesota. To escape winter, the Otis' flew to Mexico City

It seemed to me my wife and I had spent a lifetime shoveling snow and coal, and reading articles in aviation magazines about trips by private plane to wonderful vacation spots. Long about last winter we decided to do something about it.

With a previous trip to Florida in a Piper *Cub* under our belts, we reasoned it was time now for a trip to Mexico, and in a ship designed for comfortable long X-C's. So we bought our *Bonanza* and went to work on the airways charts.

The day we left Hibbing, Minnesota (at 12 noon), the temp was down to 10 below zero, and the only thing that lessened the sting of the Minnesota winter was our thought of the green grass and warm sunshine we were soon to enjoy. The one hitch to that thought, however, was the fact that instead of flying into warmth and sunshine as we had expected after that first day's flying, we found "unseasonable" weather and it dogged us all the way to Dallas, Texas!

GUIDE for American pilots at Mexico City airport is Jose Ceciliano *(right)* who did interpreting for Mr. Otis *(left)*

Not long after taking off from Hibbing's snow-struck airport, we sat down at Rockford, Illinois, on six inches of crusted snow and had to be towed to the hangar. At Douglas Airport we landed on a sheet of ice. At Springfield, Illinois and Springfield, Missouri, it was more of the same. When we came into Tulsa, I couldn't

PLANTATION owners in Mexico make good use of planes. Here one owner lands his *Navion* on strip cut out of cane field

FIELD attendants swarmed around the Otis' *Bonanza* when they landed at Mexico City after air trip from Tamuin

believe what I was seeing. The buildings were all there but everything was a glare of white instead of a soft soothing green. I called the tower to make sure we were in the right place.

We stayed in Tulsa overnight, and bright an' early the next morning we were back at the field, anxious again to get out of the cold climes. But an early take-off was not to be. Instead, we sat around until 11 o'clock waiting for tractors to spike-tooth the runways so we could get out. When take-off time finally came, we had to taxi through a churned-up mess of snow, water and ice to get out to the runway. We made it, however, and I was first in line. But the taxi job I did was a mixture of half taxi, half flying . . . and all the way out to the N/S runway, big hunks of ice thumped up against the belly of the *Bonanza*. We took off just as a cloud of low-flying scud moved in, and for the first time in my life I went on top.

We didn't run out of snow until we hit Dallas. From there on down to Brownsville the trip was uneventful and a real pleasure. This getting away from snow, ice and cold was at last becoming a reality.

All the way down, Eleanor and I had made it a point to talk to pilots about flying into Mexico. We'd managed to latch on to a lot of good information, but all of it amounted to "the trip will be easy as far as Monterrey." So our destination decision was made . . . we'd go to Monterrey and no further.

At San Antonio, we picked up a World Aeronautical chart, Madre Lagoon 522, and set out again. At Brownsville we were held up by my own forgetfulness. I had neglected to telephone the day before and announce I was arriving. As a result there were three groups of American travelers who had to be cleared ahead of us. Clearing through customs there took twice as long as flying to Monterrey.

The Mexican custom officials were very obliging, however, and spoke good English, so there wasn't any interpreting that had to be done. Passports cost us $2.10 each, clearance into Mexico took another $3.00, and two telegrams—one to the Commandante Puerto Aero Central at Mexico City and one to the Commandante at Monterrey confirming our flight plan—set us back $3.50. By the time we were cleared and had taken care of the financial end of things, it was 12 noon, and we set our course to Monterrey.

We enjoyed the flight a lot, except that every now and then we both had that eerie feeling that comes from flying over roadless, foreign, dun-colored country minus much in the way of villages and railroads for check points.

Enroute to Monterrey, we skirted the higher ranges of mountains and cut south to the railroad at Los Ramones. From there we flew the iron compass to Apodaco. Apodaco is just a few miles from Monterrey and from our vantage point above this Mexican village we could see the runways of the Monterrey airport.

By the way, if any of you flyers plan to fly to Mexico, be sure to heed the warning printed on the bottom of the map. This caution reads, "*The reliability of relief information on this chart covering the Mexican area is questionable and all elevations should be used with caution.*" We noted the comment and went into Monterrey at 6,000 . . . and even after that went up an additional 1,000 feet just for good measure.

SNOW that the Otis' wanted to escape dogged them all the way to Texas. Airport at Tulsa was snow and ice covered

Soon after we braked to a stop on the 6,000-foot runway of Monterrey's commercial airport, a Mexican field attendant came out, showed us where to park, then helped us stake down the *Bonanza* on a rocky piece of ground at the south end of the field.

We checked in with the customs official and learned, happily, that *(Continued on page 49)*

ALL-WEATHER FIGHTER, the new Lockheed F-94 is a two-seater. It houses radar equipment in its extended nose

USAF'S F-94 resembles the TF-80C jet training plane. It has same wing and fuselage structure as the F-80

MEET a new version of the F-80 *Shooting Star!* Designated F-94 by the USAF, this radically advanced version of the famed F-80 is designed to fly and fight in pitch darkness and under conditions of weather and visibility that would ground today's standard jet fighters.

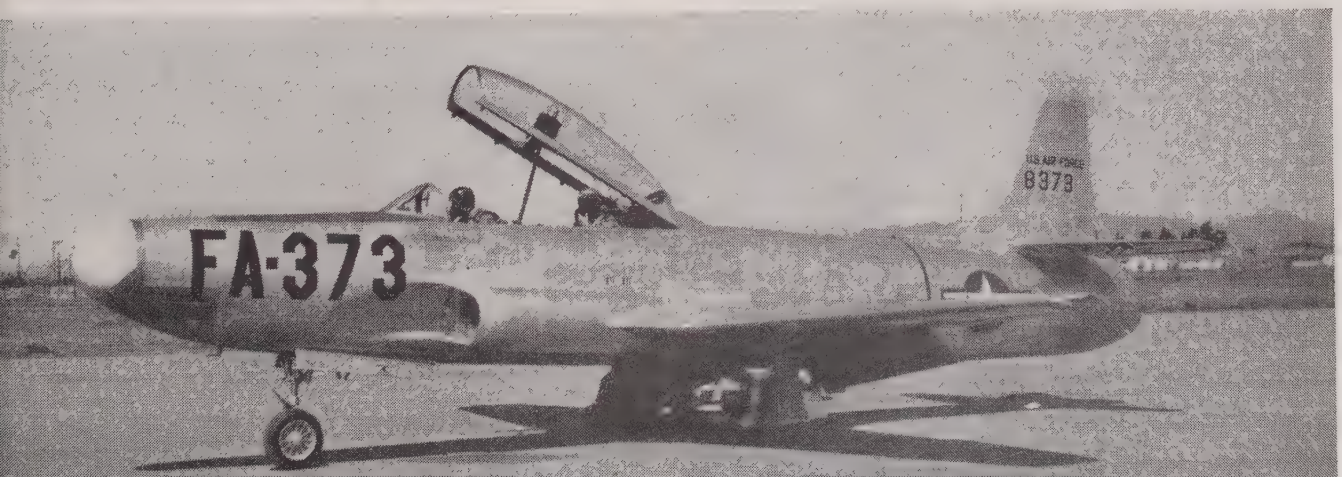
The F-94 is a two-seater, basically resembling the Air Force' jet trainer, TF-80C. With same wing and fuselage structure as the F-80, the F-94 will come off parallel assembly lines.

Most striking difference between F-80 and F-94 is the extended nose section which houses the ship's radar equipment. This radar installation enables the F-94 to search out and destroy aircraft after having been radio-directed to the vicinity of enemy planes by radar ground control.

The F-94 pilot will sit in front cockpit, and radar operator will occupy rear cockpit.

F-94... *Night Fighter*

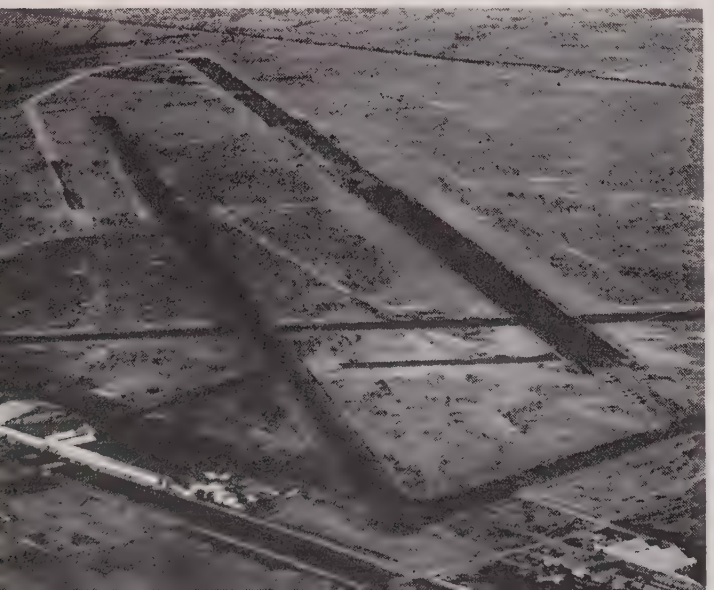
FEATURE of the new F-94 is its Solar afterburner which adds to total thrust of the Allison J-33 jet engine



Pilot's Report...

PIPER CUB 90

PIPER CUB SPECIAL, owned and operated in Mexico, carries XB-FAG license. All private aircraft in Mexico carry this "XB" designation, corresponding to our "N". Pilot-Author Downie flew Cub from Mexico City Central Airport *(below)*



By DON DOWNIE

JUST about every pilot has flown a *Cub* trainer —even here in Mexico.

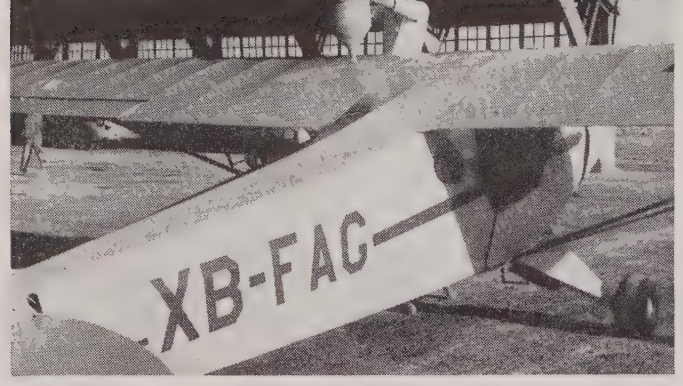
And just about every one of them has a soft spot in his heart for this bright little yellow trainer.

In the past 18 years, over 20,000 *Cub* trainers have rolled out the factory doors at Lock Haven, Pennsylvania. At least 150 of them are now flying in Mexico.

Actually, the new *Cub* "90 Special" differs little in appearance from the old 1932, 37-hp E-2 *Cub,* but it flies a whale of a lot better. Cruising speed on the old 37-horsepower ship was about 65 mph. The new "90" will do about 100 mph. Rate of climb has gone up from 350

PILOT'S REPORT flight in *Cub* was made over city. This photo of Soldier's Monument was taken from "test" plane

TRADE-MARK TAKE-OFF is here demonstrated by Mr. Centeno, who claims it helps him sell airplanes. Field is 7,347 feet above sea level, but Centeno puts *Cub* "90" into extremely steep climb right after ship leaves the ground



PLANE GAS in Mexico goes into tank through chamois filter. If you fly to Mexico, be sure this is always done

LANDING "tests" were made at Aero Club's Campestre Field, a sod strip near race track. Elevation is 7,600 feet

to nearly 1,000 feet per minute and here on the mile-and-a-half-high airports surrounding the Capital of Mexico, the new *Cub* "90" is at its best.

The Central airport at Mexico City is 7,347 feet above sea level and visitors here often take a week to become accustomed to the altitude before they can climb a flight of stairs without stopping for breath. It isn't so with the *Cub* "90."

Martinez Centeno, Chief of the Piper sales division of W. S. Durkin Motors, the Mexican distributor, showed us some hair-raising performances in the little "90" in spite of the altitude. For this SKYWAYS article, we used a brand new "90" with only 27 hours on its log books—and that was all ferry time from the factory. Our *Cub* carried the license number XB-FAG, but don't let the designation fool you. The ship was anything but fagged.

In Mexico, all private aircraft carry the letters XB while airline ships have the prefix XA. This corresponds with the Stateside "N" designation and is followed by the number of the plane.

We met Mr. Centeno at the Durkin hangar in the far corner of the big municipal airport. Just across the highway was the brand new *Convair* belonging to the President of Mexico. Mr. Centeno wheeled the glistening new XB-FAG out of the hangar and checked the gas gauges. They showed almost empty, so he drained five gallons from a *Cub Cruiser* sitting in the hangar and poured it into the 17-gallon tank located in the left wing root. Everywhere in Mexico, gasoline goes into aircraft tanks through a chamois filter to remove the dirt and water. It is good flight insurance . . . and don't forget it!

CUB DEALER in Mexico is Martinez Centeno *(left)*, shown here explaining his flying technique to Author Downie

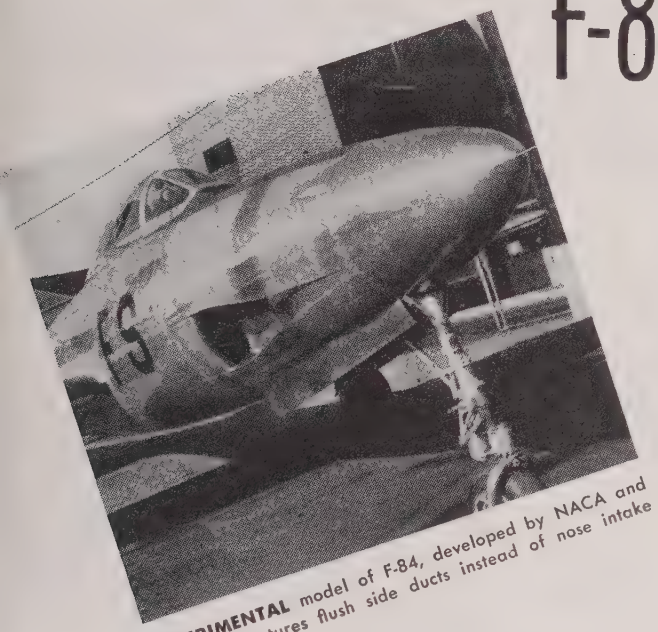
MAIN RUNWAY of the Aero Club field is shown in this picture made just after the new *Cub* "90" got off the ground

The ship still had the factory-new smell and Mr. Centeno explained that he had flown it down from Brownsville, Texas, earlier that week. He explained that *Cub* factory pilots or flying club members frequently brought the ships as far south as the border and he picked them up there. Ferry expenses from Lock Haven to Mexico City, including fuel, insurance, one-way airline fare and an allowance for meals and hotels, cost the customer $279.

Instead of taxiing nearly a mile to the main runway, we rolled down a small dirt strip near the Durkin hangar and *(Continued on page 57)*

LATEST PRODUCTION version of the F-84 is Republic's F-84-E. Feature of the "E" is increase in power from Allison J-35

F-84 Experimental

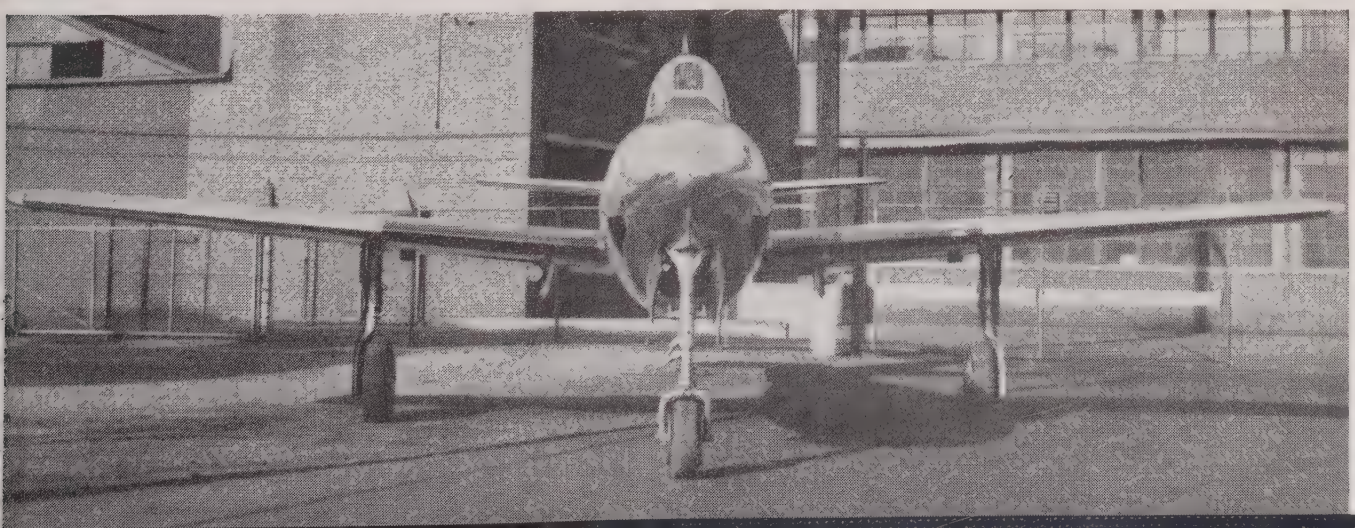


EXPERIMENTAL model of F-84, developed by NACA and Republic, features flush side ducts instead of nose intake

WHILE Republic Aviation's production lines turn out the newest and latest *Thunderjet*, the F-84-E, experimental work on another F-84 goes forward. Working in cooperation with the National Advisory Committee for Aeronautics, Republic has developed flush side inlet ducts which replace the usual front ducts normally used on the F-84. This development permits the installation of radar equipment in the nose section with no performance loss to the airplane. Present plans do not call for use of the new ducting system on production models of the F-84 being turned out for the Air Force.

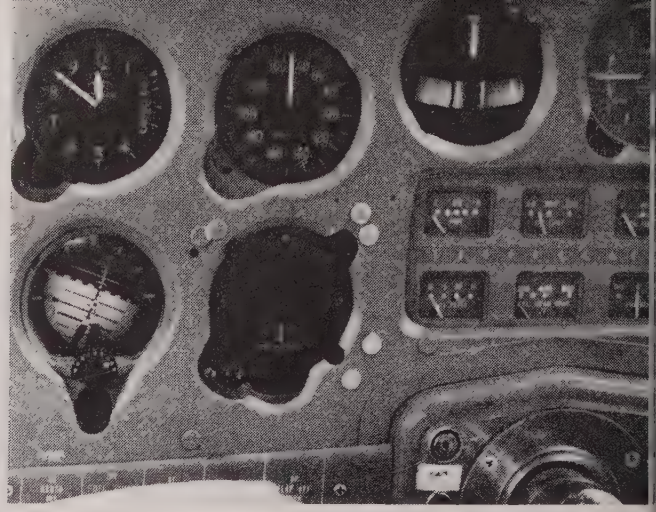
The F-84-E now being delivered to the USAF features more power and greater performance in speed, range and altitude. The radius of action of the new "E" is better than 850 miles.

DEVELOPMENT of flush side intake ducts permits installation of radar equipment in nose section in the *Thunderjet*



THE GAUGES in EASY STAGES

By BILL ODOM



PILOT ODOM uses Sensitive Altimeter with Turn-and-Bank to show position of plane's nose. Note Artificial Horizon *(above)* in "tumbled" position. Sensitive Altimeter reads below sea-level due to overnight pressure change

PLANE OWNER who wants instrument group should get Turn-and-Bank first. Here Odom points to T-and-B in Cessna

FLARES are good equipment for all planes used in night trips. Here Bill points to *Bonanza's* flare release ports

INSTRUMENT flight plan is filed with Pete Lewis at La Guardia Field just before Odom takes off on an IFR X-C

Instrument flying takes practice, but it's fun done this way

Photos by Bill Price

THE most important maneuver for a lightplane pilot to know when he's headed into bad weather is the 180-degree turn back towards home.

Make this maneuver your primary instinct when visibility and ceilings close in, and you can't go wrong.

There's a reason for this.

A private pilot flying a single-engine airplane on an instrument flight plan is confronted with a much tougher job than any airline pilot riding the left front seat of a transport plane. Take it from me, I've done it both ways. A lightplane flyer has no co-pilot to help him, he has no dispatching organization on the ground funnelling information to him, and he sure is in more trouble if one engine quits.

Starting with this word of caution, however, let me be quick to add that an ability to fly under Instrument Flight Rules can be extremely valuable to any lightplane pilot. And under some conditions, an IFR flight is not only the smart, but also the safe way to fly.

Instrument technique, too, can help relieve your tensions when city lights disappear and the moon slides behind a cloud deck during a night cross-country.

ODOM installs orange windshield designed to allow pilot to fly instruments under CAVU

The great problem, of course, is training.

There is nothing mysterious or even difficult about flying instruments, but it does take training, practice and, of course, equipment.

How to secure these three without going broke is a problem.

If you're going to actually fly instruments, you need a standard instrument course and an instrument ticket. You either pay for it yourself or get it under the GI Bill of Rights. In either case, not even considering the money aspect, the time and study involved in getting the ticket is a big thing. To me, it's worth it.

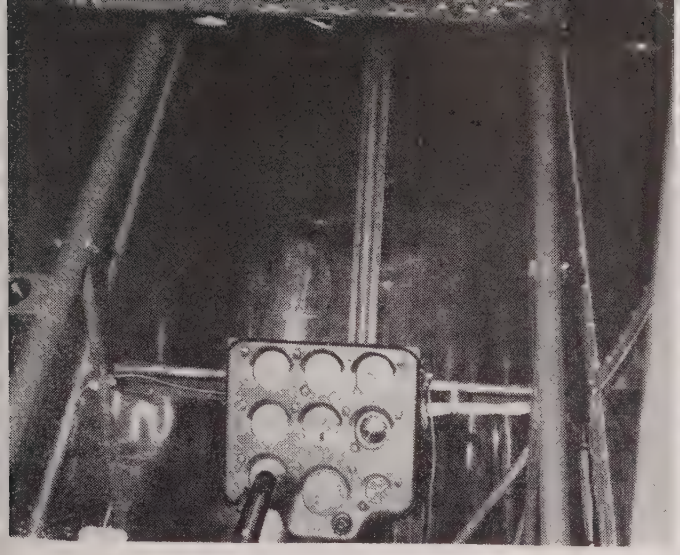
I imagine it would be the same for any pilot planning to do regular flying.

But even if you don't plan to get a ticket, learning the basic principles of instrument flying is something every pilot will find invaluable. And the most valuable experience you can get is the time you accumulate in your own lightplane. Fortunately *(Continued on page 44)*

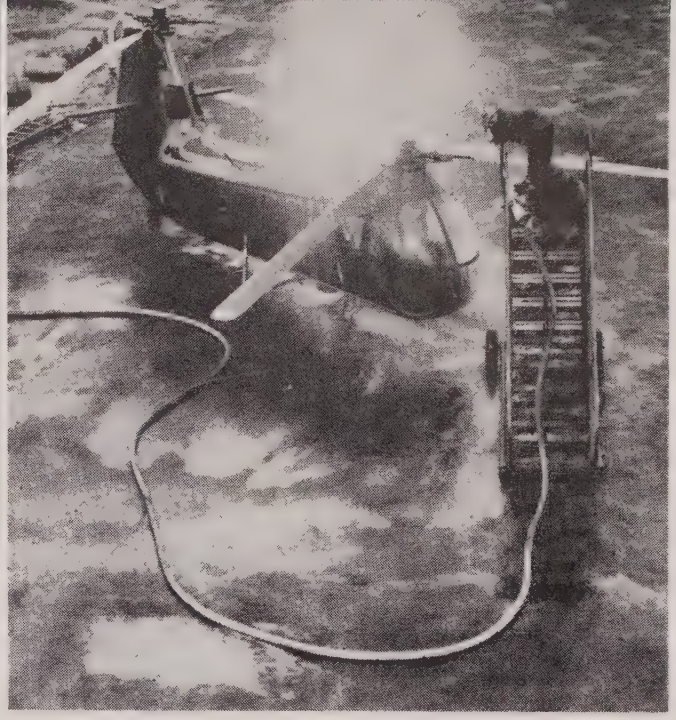
Flying the HRP-1

NAVY'S "Flying Banana," the HRP-1 *(above)*, demonstrates its ability to effect mass evacuation and rescue

TRANSPORT 'COPTER, the HRP-1, is capable of carrying useful load of fuel, crew of two, eight passengers or cargo



PANEL consists of *(top, left to right)* Engine Oil, Carburetor Air temp; Fuel, Oil Pressure; Cylinder temp; Forward Gear Box Oil temp; Center Transmission Oil temp; Aft Gear Box Oil temp; Fuel quantity; Voltmeter. Lower panel *(left to right)* has Airspeed Indicator; Rate-of-Climb; Altimeter; Rotor Tachometer; Turn-and-Bank; Gyro Attitude; Manifold Pressure; Directional Gyro; and Clock. The stick (only grip visible) is the HRP-1's Cyclic Control



RAIN didn't come so engineers borrowed fire department's hose to test HRP-1's rotor blades for waterproofing

THE HRP-1 helicopter, better known as the "Flying Banana," is at the present time the largest helicopter in the Naval Service. Designed originally for the performance of rescue missions, its excellent weight-lifting capabilities have since demonstrated the feasibility of employing the HRP-1 for many other military duties. In addition to search and rescue, its more important uses are troop transport, cargo transport and as a flying crane for carrying large, bulky articles for short distances. The latter is performed by the use of an external wire sling to which objects are attached while the helicopter hovers overhead. Upon arriving at his destination the pilot, by means of a quick release mechanism, deposits the load by merely pulling a lever.

The helicopter is equipped with an hydraulically operated rescue *(Continued on page 56)*

HOIST, hydraulically operated *(above)*, is mounted above main entrance door and is designed to lift or lower 400 pounds a distance of 100 feet. Sign of the times *(below)* warns autoists of this helicopter crossing area

By A. A. Vandegrift

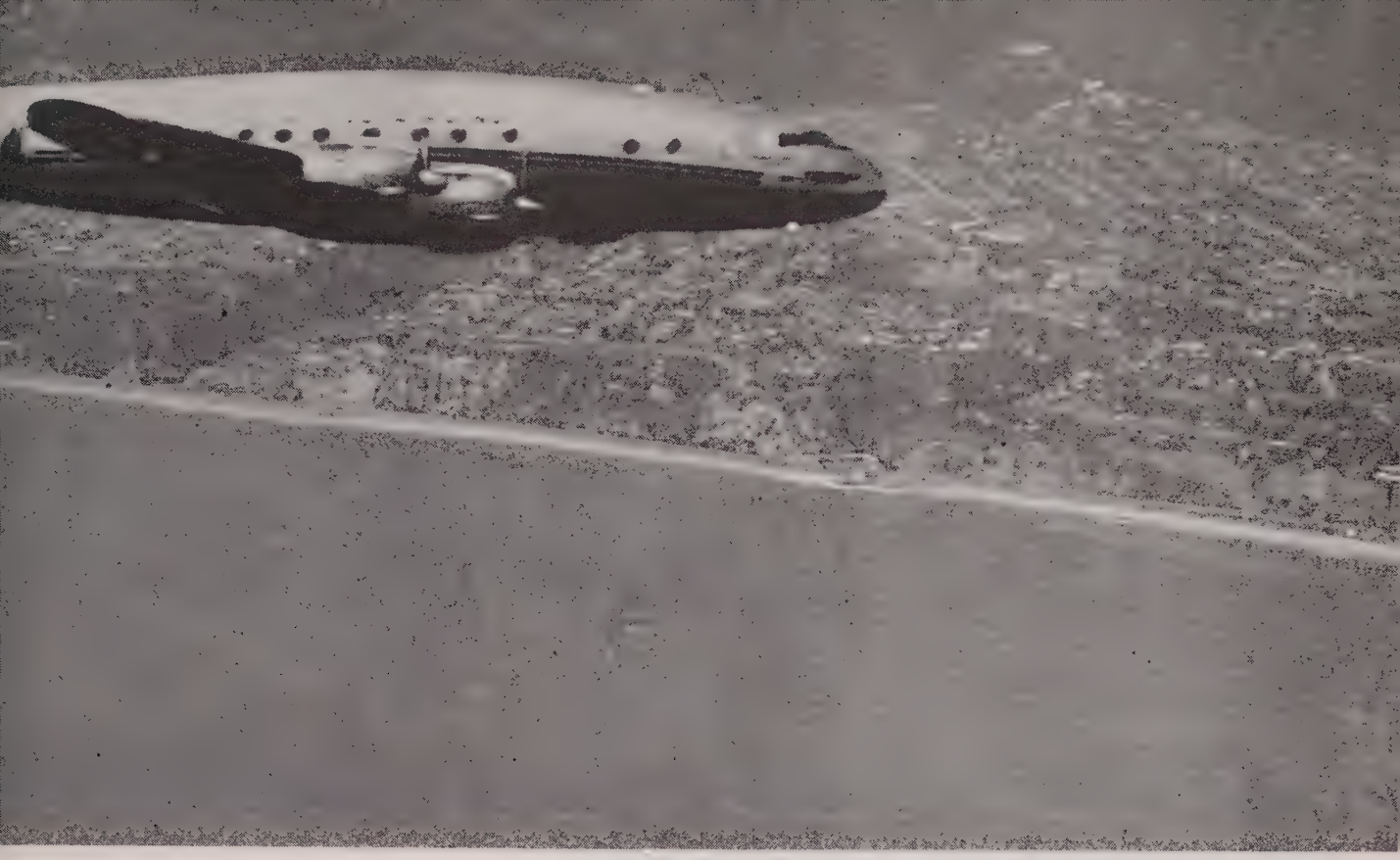
Major, U. S. Marine Corps

TWENTY YEARS' progress in air travel is graphically shown in t

Yesterday and Today

CABIN comfort has progressed, too . . . and so have fashions. In 1929 cabin of Ford Tri-Motor *(above)* was considered luxurious and tops in comfort. Compare its 10-place cabin with today's TWA *Constellation* and its spacious interior

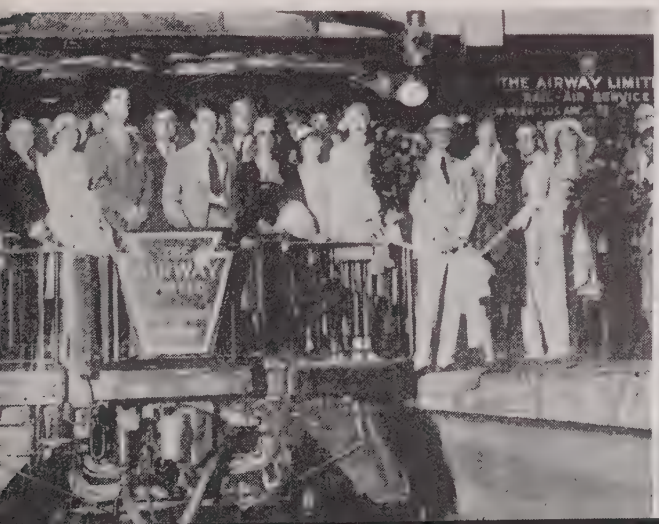
TAT'S ROUTES (now TWA) were laid out by Charles Lindbergh, shown below at plane christening with Mary Pickford, etc



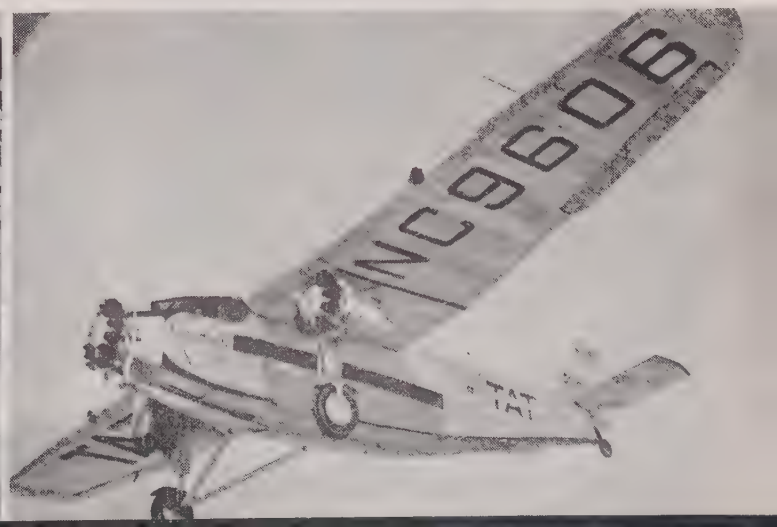
his photo of start of TWA's "Tin Goose" and "Connie" flight

TWENTY years have produced a lot of changes in everything... but none quite so pronounced as those in the field of air transportation. Celebrating its 20th anniversary in scheduled coast-to-coast air passenger service, Trans World Airlines recently sent "Tin Goose" of the vintage that flew the airways 20 years ago on a journey from Los Angeles to New York. Taking off with the Ford Tri-Motor was one of TWA's newest *Constellations*. The "Connie" reached New York in 9 hours, whereas the "Tin Goose" ran into minor difficulties and took 12 days. TWA of 20 years ago featured coast-to-coast service in 48 hours, by plane *and* train.

TODAY'S Trans World Airline and its "Connies" was yesterday's Transcontinental Air Transport with its "Tin Goose." Crew of a "Connie" *(above)* listens to Capt. F. Preeg who flew "Goose" recount experiences of another year



COAST-TO-COAST in 1929 involved train travel, too. Passengers took train to Columbus, Ohio, then plane from there



Slingshot Get-Away

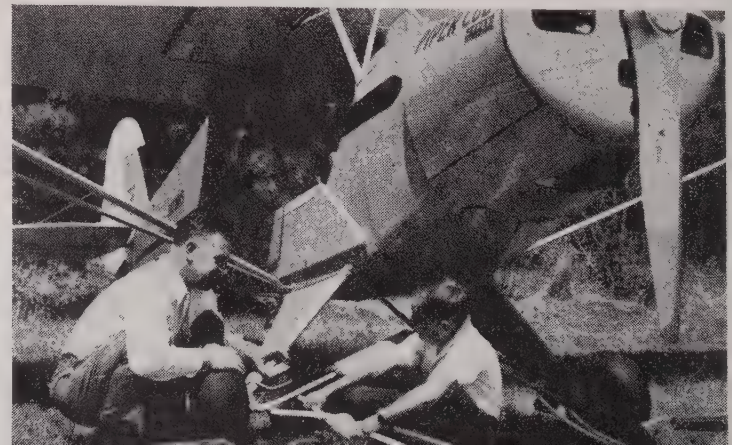
SKYWAYS' advertising manager Al Bennett ties the Cub down in his own front yard

The Piper's parked at home, thanks to a gadget

By HARRY GRAYBILL

PILOT BENNETT demonstrates how 90-foot shock cords are anchored over stakes 180 feet ahead

FAMILY CAR is used to stretch chord twice normal length. Block of wood (below) "holds" one chord to ship's gear



CHORDS fastened to landing gear and stretched extra 90 feet to anchor stake at other end, two Bennett Children—Betty Lee and Al Jr.—release chocks fastened to long poles. Simultaneously, engine is revved up, plane's off

THE 90-hp *Cub* was off the ground in three and a half seconds with a take-off run of 70 feet. And it wasn't staggering. It went right on up, climbing at a startling angle to an altitude of some two hundred feet, at which point it went into a normal climb. Even taking into consideration the slightly downhill take-off and a light wind of about 10 mph, that's spectacular performance.

This remarkable demonstration took place recently in the front yard of Alfred B. Bennett's Westchester home in the suburbs of New York City, and it has taken place there many times. Al Bennett, adver- *(Continued on page 43)*

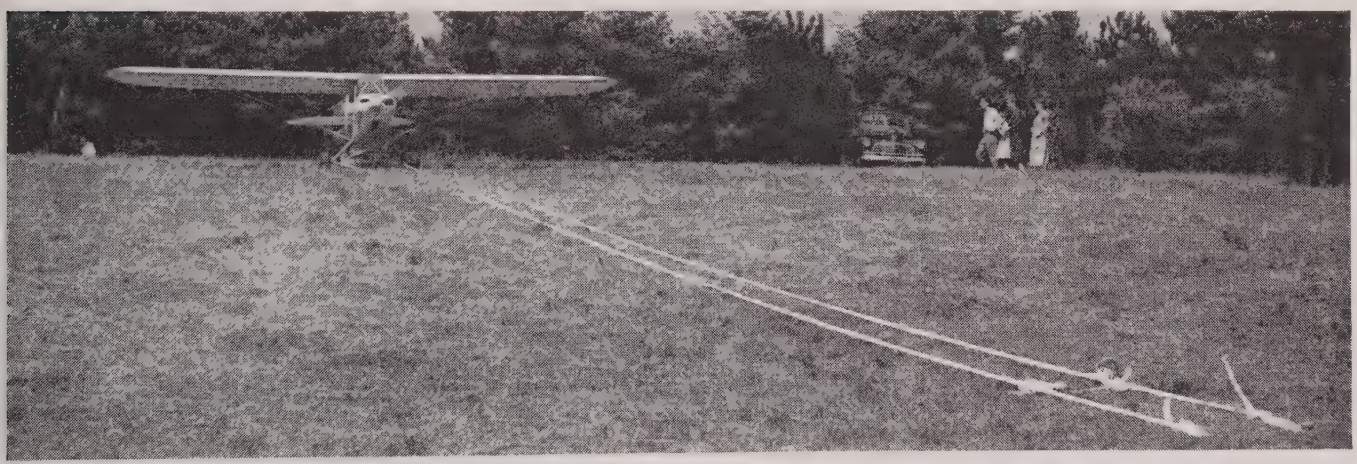


PHOTO *(above)* was taken just after chocks were removed. Al Bennett has applied full power, plane is in motion

CUB is off ground in few seconds *(below)*. In 10 seconds plane is 200 feet up, has traveled 300 feet over ground

FEATURE of *Navion* that means increased plane utility to Yoxtheimer is ship's ability to get out of small fields

FLYING COAL MAN hops his *Navion* from home office at Northumberland to strip mine at Punxsutawney, 114 miles away

How can a coal miner use an airplane? George H. Yoxtheimer, veteran bituminous strip miner of Punxsutawney, Pa., supplies the answer to that one.

"I don't believe an operator in this industry can afford to be without a good plane," George Yoxtheimer says. "My own *Navion* is darn well indispensable."

A mightly strong statement from an operator who has seen scores of highly touted new tools and techniques appear and fade during a life-

FLYING COAL MAN

MAIN USE of Yoxtheimer's plane is carting spare and repair parts to mine site. He lands very near the mine

time in coal mining and heavy contracting.

In talking to Yoxtheimer you are soon cut into the fact that his ship's reputation for usefulness stems from the host of jobs it has helped him accomplish. The trim maroon plane you see standing nearby has had to earn his all-out recommendation.

Many times Yoxtheimer's *Navion* has been the sole means by which he was able to fill coal orders.

"The ship has paid its own way," he puts it. "Time saved during equipment breakdowns alone would cover its expenses."

The flying coal man's main office is tucked away in an unobtrusive building in Northumberland, Pa., 114 air miles from his major stripping operations at Punxsutawney, an isolated town northeast of Pittsburgh and one that claims only poor freighting facilities.

As head of his own company, Yoxtheimer is responsible for contacts with coal brokers in Philadelphia. His frequent meetings with them require what resembles a regular schedule of air travel over the 200 miles separating that city from his office. But those trips make up only a small portion of his flight log.

When he's at the office, and machinery troubles occur at the mine, Yoxtheimer comes to the rescue. Getting together the necessary repair parts, he loads them aboard the plane, picks up a consulting engineer, and wings toward the hill country. Frequently *(Continued on page 48)*

NOTES compared, Yoxtheimer *(right, above)* discovered that while his friend Fred Raffeto *(left)* never stepped out of his place of business, he flew to New York and back, then to Detroit and back . . . and was home for dinner

FIRECAN JOCKEY

THE next time you see a jet pilot, walk up and talk to a guy who really knows his business. The Firecan Jockey is not so by accident . . . he's a well-trained pilot of reciprocating engine aircraft first, and he's stepped into jet flying after weeks of intensive training in the operation of jets.

Meet Lieutenant Leroy Price, for example. Lt. Price, of Pleasantville, N. J., is a former B-29 pilot with some 1500 hours. Transferred over to jets, Lt. Price had to start from scratch and go through weeks of training in jet engine maintenance, operation and navigation. When Lt. Price made his first jet flight, it went off easily, thanks to the training.

As his fellow pilots put it, "The Firecan Jockey got into his blow torch, sparked up to a steady boil, turned up the wick . . . and leaped off . . ." +++

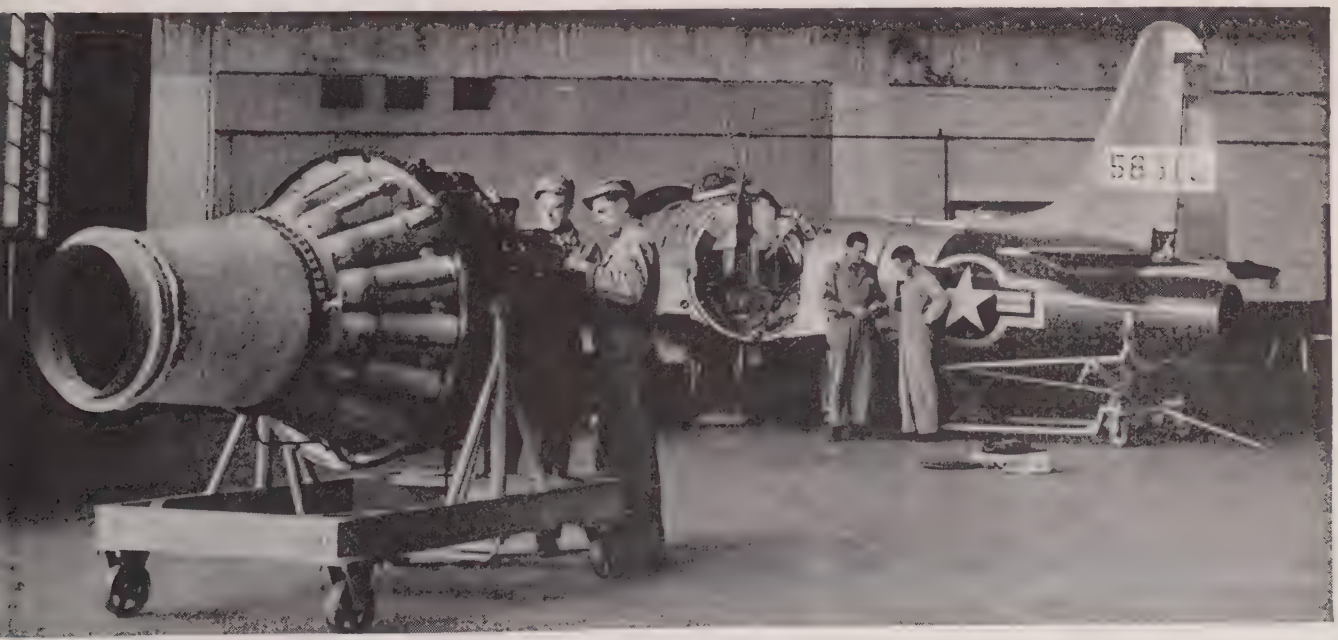
FIRST FLIGHT in F-80 coming up, Lt. Price snaps on his oxygen mask. Ground training makes first flight easy

JET PILOTS, flying at over 500 mph, cover lot of ground. Here they're briefed on that area

BLOW TORCHES, a trio of them, leap off in formation from Andrews Air Force Base, at Camp Springs, Maryland

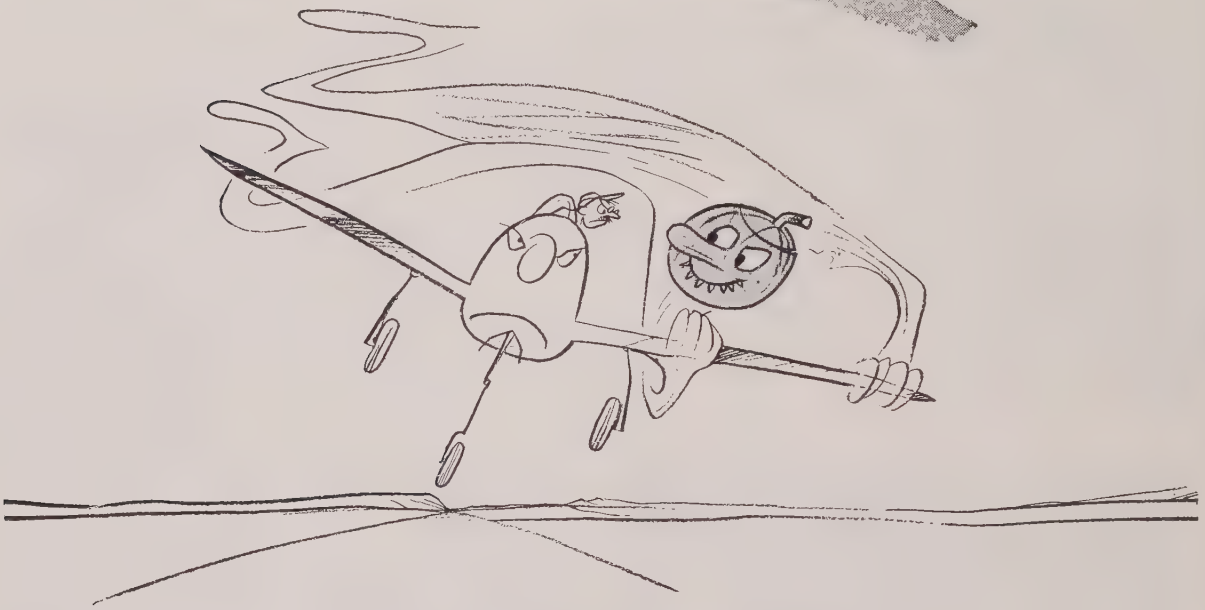
COCKPIT of jet plane is very different from prop aircraft, so Major Hinton gives Price a cockpit check

CONGRATULATIONS are in order after Lt. Price's first flight. It went off easy, thanks to good AF training



JET ENGINES, awaiting installation in F-80's, are studied carefully by Lt. Price *(right, background).* Just as Price had to learn about maintenance of conventional aircraft, he once more donned coveralls to learn about jet

DILBERT



By Seth Warner and Robert C. Osborn

Mr. Dilbert Goes To Washington—He had 550 hours flight time when he recently attempted to fly from Norfolk to Washington, via Richmond. Weather was good and the flight plan called for VFR all the way.

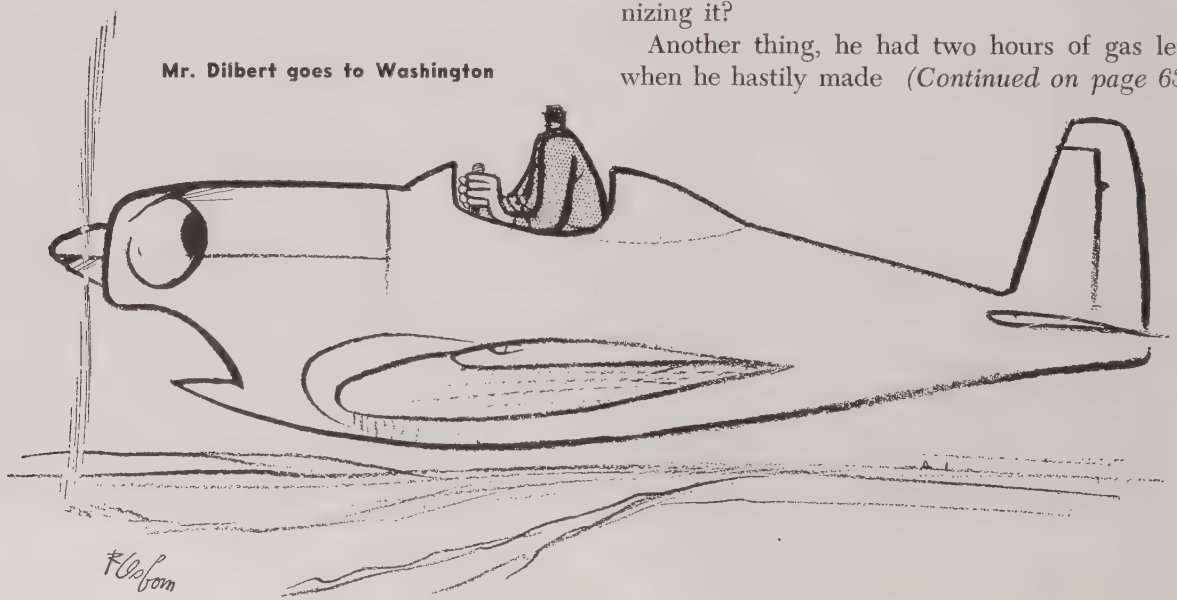
The flight to Richmond was on the nose, but then his radio went out and he couldn't ride the Washington beam. He took a heading which he "thought" would bring him over Washington, but he passed so far to the west of the city that he didn't even see it.

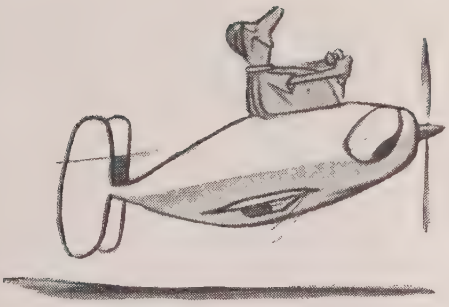
Some time later, after flying on various headings without finding any landmarks he could identify, he decided he was lost, and landed in the nearest field—40 miles north of Washington. The landing was not a success; there was a drainage ditch running through the field.

Well, that's just about what you can expect when you go barging around the country without keeping track of your position on the chart. Maybe Dilbert didn't even have a map. But how could he cross the Potomac River without recognizing it?

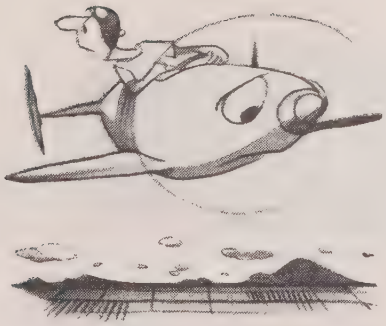
Another thing, he had two hours of gas left when he hastily made *(Continued on page 63)*

Mr. Dilbert goes to Washington

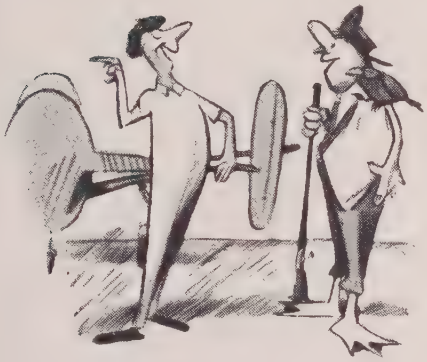




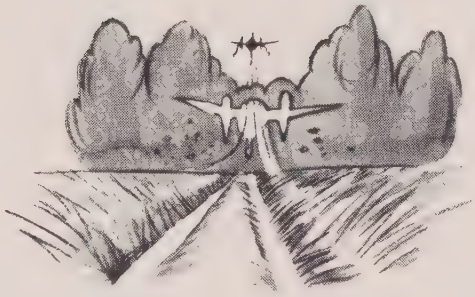
1 Dilbert takes off on an X-C



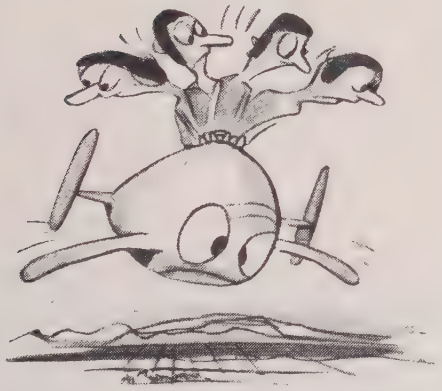
2 Loses no time getting lost



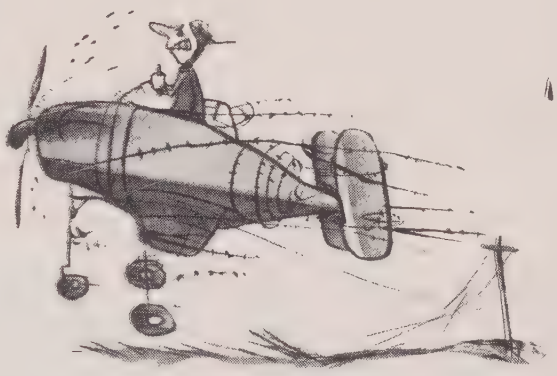
3 Puts down for directions



4 Gnaws his way back into air



5 Hm . . . gets lost again



6 Lands again without dragging field

7 Refuels with ye olde auto gas

8 Get off? No! Is towed home

TRUE STORY!

Operational Engineering

Service Notes: Continental C-85 Engine

CONTINENTAL C-85 engines power many of the popular two-place personal aircraft in service today. The following general information on specifications and routine maintenance is presented by SKYWAYS to aid pilots, owners and operators of aircraft equipped with C-85 and C-75 engines.

General Information—Engine Types and Equipment

C-75 and C-85, Series 12, 12F, 12J and 12FJ engines are identical in general construction. The differences between the C-75 and C-85 models are in engine ratings, carburetors and oil sump capacities. An "F" added to the series designation indicates the engine has a flange-type crankshaft in place of the tapered crankshaft for the propeller installation. "J" indicates the engine is equipped with a fuel-injection system, while the addition of an "H" indicates the engine has provision for connecting hydraulically operated propeller. The C-75 engine is rated at 75 BHP at 2275 rpm, has a venturi size of one and five-sixteenth inches and a four-quart oil sump capacity. The C-85 engine is rated at 85 BHP at 2575 rpm, has a venturi size of one and three-eighth inches and normal oil-sump capacity of four and one-half quarts.

They are four-cylinder, four-cycle, horizontally opposed, direct-drive, overhead valve, air-cooled, clock-wise rotating engines.

Ignition system: Magnetos are dual Eisemann LA4R or equivalent with the right mag firing the upper plugs at 28 degrees BTC and the left mag firing the lower plugs 30 degrees BTC. The cylinder firing order is 1 - 3 - 2 - 4, with Cylinder No. 1 at the right rear side of the crankcase, No. 2 at the left rear, No. 3 at the right front and No. 4 at left front. Spark plugs are Champion unshielded C26 or shielded C26S or equivalent, and should be tightened to a torque limit of 300 to 360 inch-lbs on installation.

Fuel system: Carburetor is a Bendix-Stromberg NA-S3A1 to be used normally with 73 octane gasoline having a lead content of not more than ½ cc per gallon. The alternate fuel-injector system available is an Ex-Cell-O, including an injection pump, discharge lines, atomizing nozzles and an air throttle and linkage to the injector pump.

Oil system: The fully enclosed system should be serviced with SAE 20 oil when the outside air temperature is below 32° F., SAE 30 when it is between 32° and 70° F., SAE 40 when it is between 70° and 100° F., and SAE 50 when it is above 100 degrees.

Engine Troubles and Service Remedies

Failure of engine to start: May be due to lack of fuel. Check tanks for sufficient fuel; make certain vent holes in the fuel tank caps are open; check the gasoline flow at the carburetor, see that the carburetor float is not stuck.

It may be due to over-priming or under-priming. Weak explosions and puffs of black smoke from the exhaust would indicate over-priming. Turn the ignition switch *off*, place throttle at full open position and pull the propeller through three or four revolutions to clear excess fuel. If engine is under-primed, repeat starting procedure with normal priming, three or four strokes of prime, depending on weather conditions and temperature of engine.

If engine is hot that may be the cause of over-priming and failure to start. Do not prime a hot engine; there is usually sufficient fuel left in the cylinders when the engine was shut off. If engine is flooded, clear as above.

Trouble may also be in ignition system, if repeated attempts fail to start engine and fuel system and starting procedures are all okay. Check ignition wiring, spark plugs and magnetos for proper condition and correct adjustments. Check for a possible short in the ignition switch.

Low oil pressure: Check quantity of oil in sump by means of cap dipstick, also check quality of oil. Other causes may be defective oil pressure gauge, dirt in oil screen (remove and clean), oil pressure relief valve dirty, worn bearings or clogged oil-sump suction tube screen.

AERONCA SPRAY-CHAMP, utility version of the *Champion,* is powered by 85-hp Continental engine. Equipped, it sells for $3,160.00

High oil temperature: Among the several possible reasons for high temperatures may be: oil supply low, incorrect grade of oil, failure to remove winter baffles, prolonged ground operation at high rpm, excessively lean fuel mixture on ground or in flight. High oil temperatures may also indicate wearing or improper operation of engine parts in which case the engine will require a close check by a specialist.

Low power: Check the following: throttle control linkage for proper operation of butterfly valve; entire ignition system for proper condition and operation; air leaks in engine intake system; proper operation of carburetor heat control, insuring that heat can be turned off completely; improper pitch or damage to propeller blades; restrictions in flow of fuel or air to carburetor; tachometer operation.

Rough engine operation: Check propeller for track, balance and correct installation. Check spark plugs, clean if necessary and re-set gaps (.014 to .018 in.) or replace with new plugs. Magnetor or ignition system defects may also cause a rough engine. Other reasons may lie in the valve and valve mechanism condition and operation or in the engine mount, all of which should be checked by an engine mechanic.

Engine does not idle properly: Before correcting carburetor idling adjustment, check for air leaks in intake system and intake manifolds, improper firing of plugs or poor cylinder compression.

Depending on installation and aircraft manufacturers' preferences, engine should idle between 500 and 600 rpm, although the carburetor idling system is actually in operation up to 900 to 1,000 rpm. Two adjustments may be required to get proper idling and either should be made with the engine hot to get proper results. The idle mixture adjustment on the NA-S3A1 carburetor is a small knurled screw on the throttle valve body. Turning this screw in a clockwise direction leans out the mixture; turning in the opposite direction gives a richer mixture. A throttle stop on the throttle shaft next to the throttle control lever on the carburetor may be adjusted to get the desired idling speed.

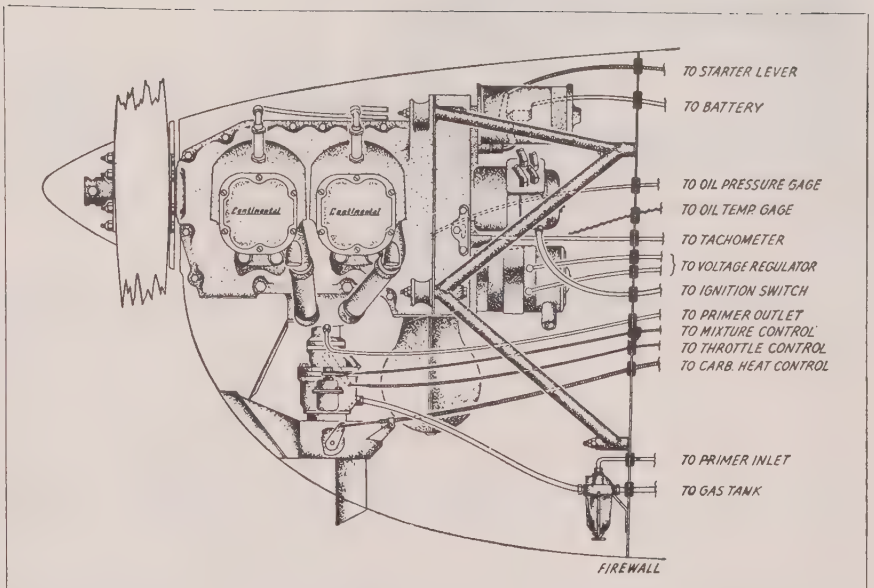


DIAGRAM shows typical installation of 85-hp Continental in a lightplane

Recommended Service Inspections

Preflight or daily engine inspection: Should be made before the start of the day's flying (preferably) or after the last flight of the day to be sure things are okay for next days' flying.

Check all the following: 1) propeller for nicks, cracks and security to hub and crankshaft; 2) carburetor for full range opening and closing of throttle and air-heat unit; 3) fuel filter bowl for sediment and water, lock drain and safety; 4) oil dipstick should show full sump; 5) fuel tanks should be full; if caps are vented type, insure that vents are open; 6) all lines must be inspected for leaks, or traces of such; 7) all ignition wiring for tightness and condition; and 8) entire engine for loose parts, missing nuts, proper safetying and condition of all accessories.

100-Hour inspection: The complete inspection is included in the Continental Manual. The particular steps which require more than the usual searching visual check are as follows:

Check the carburetor air filter for dirt. Wash in clean gasoline. After drying, cover front and rear elements with light oil and allow to drain before re-installing.

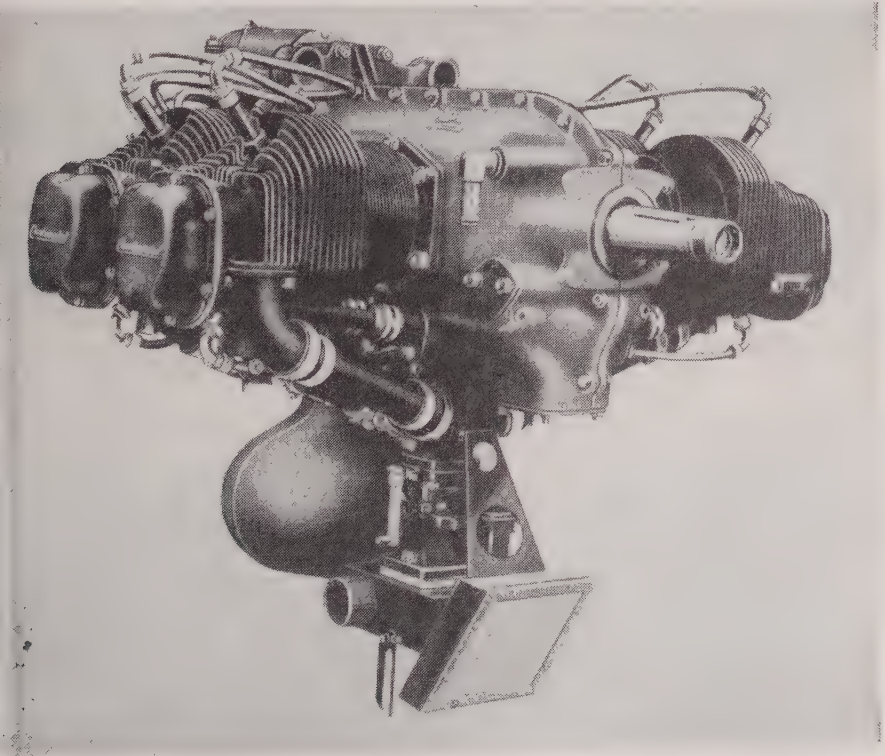
Check spark plugs for cleanliness and check for proper gap. New or re-used plugs should be installed with serviceable gaskets only. Check magnetos.

Remove the oil screen and oil suction tube screen (in sump), wash in clean gasoline and replace. Remove rocker box covers and check the valve mechanism. Interior of rocker box covers should show complete coverage with engine oil.

Remove fuel filter bowl, clean out water and sediment, replace, turn fuel on and check for leaks, especially at gasket.

Remove plug and strainer from carburetor float-chamber fuel passage. Clean strainer and flush out any water or sediment by allowing fuel to flow through strainer and drain plug opening.

CONTINENTAL'S C-85 engine is four-cylinder horizontally opposed with 90-hp take-off rating



General

The above information—while some of it may appear to apply to any make of light power-plant—is concerned only with the C-75 and C-85 engines manufactured by the Continental Motors Corporation. All maintenance work other than routine cleaning and service should be done by a licensed engine mechanic, or under the direction of one, according to CAR's.

CAOA REPORT . .

CORPORATION AIRCRAFT OWNERS ASSOCIATION, INC.

Corporation Aircraft Owners Association is a non-profit organization designed to promote the aviation interests of the member firms, to protect those interests from discriminating legislation by Federal, State or Municipal agencies, to enable corporation aircraft owners to be represented as a united front in all matters where organized action is necessary to bring about improvements in aircraft equipment and service, and to further the cause of safety and economy of operation. The CAOA headquarters are located at 444 Madison Avenue, New York 22, N. Y.

CAOA Forum

At the time of writing this the members of your Association, their representatives, guests and others are gathering in Washington, D. C., for the Second Annual CAOA Forum.

The next CAOA report (November issue) will cover the Forum with both copy and pictures, for the benefit of those who, for business reasons, could not attend the gathering in Washington.

The speakers this year will be of particular interest and the subjects they will cover include the following: protective maintenance; flying the executive passenger; flying safety for the executive pilot; servicing the itinerant executive plane; executive aircraft insurance, etc.

Among the speakers are such aviation personalities as Brigadier General James W. Spry, Chief of Maintenance Division, United States Air Force; Mr. Gordon Sleeper, aviation insurance expert, Frank B. Hall & Co., Mr. Fred B. Lee, Deputy Administrator, CAA; Mr. Walter C. Pague, CAOA Technical Committee Chairman; Mr. Joseph T. Geuting, Jr., Manager, Personal Aircraft Council of the Aircraft Industries Association; Robert Aldrich, Director, Minneapolis-St. Paul Aviation Authority and Mr. Cole H. Morrow, CAOA Director and Chief Plant Engineer of the J. I. Case Company.

The luncheon speaker will be CAOA's only Honorary Member, Capt. William P. Odom.

By the time you read this, the Forum will have taken place. Even if you were there, we know you will be interested in reading about it in our next issue. If you could not make it, we're sure you will find next month's CAOA Report pages of particular interest.

H. L. Maurhoff New CAOA Treasurer

At the July 20th meeting of the Board of Directors of CAOA the resignation of William R. Martin as Association Treasurer was regretfully accepted.

Mr. Martin, Assistant to the President of the Bristol Myers Corp. and who has served so well as CAOA Treasurer for the past few months, has been replaced by Mr. H. L. Maurhoff, recently elected to the Association's Board of Directors.

Mr. Maurhoff, in charge of aviation activities for National Dairy Products Corp., New York City, is Assistant Treasurer of that corporation, which post he has held for the past nine years.

An engineer by training, Mr. Mauroff, a graduate of RPI, has had extensive experience in business and finance and has shown a keen interest in aviation for many years. This combination makes Mr. Maurhoff an ideal selection for the post of CAOA Treasurer. His acceptance of the position is greatly appreciated by the Association.

CAOA Member Plans "Big Distance Trip"

Mr. Sam Keener, President of Salem Engineering Company of Salem, Ohio, famous as an air traveler and user of executive aircraft, plans a 30,000 mile, globe-circling business trip.

Having tried over-the-ocean flying in his own Douglas DC-3 last year, Mr. Keener, has now purchased a Douglas four-engined Mainliner (DC-4) from United Air Lines for the proposed business trip.

Mr. Keener, one of our staunchest CAOA members, plans to visit 33 cities in 24 countries in the Mainliner while on his "Big Distance" flight. The CAOA decals on his ship will be seen by many nationalities and commented upon in many languages before he returns. We wish Mr. Keener good flying and CAVU's until his return.

Executive Service

Today, the owners and operators of executive aircraft are particularly interested in service operations that are specifically geared to executive-ship maintenance. These owners and operators will do well, therefore, to make a note of the National Aircraft Maintenance Corporation, based at Newark Airport, New Jersey.

This outfit presents one of the most formidable lists of test-stand equipment any executive operator has ever seen. Costing somewhere in the vicinity of $200,000, these tests stands and specialized machines provide searching inspections and service to starters, generators, mags, props, oil and fuel systems, coolers, cabin heaters, etc. In addition NAMCO offers complete magnaflux and magnaglo equipment.

If the executive-plane operator wings his way East and puts in at National Aircraft Maintenance Corp., he'll find hangar space, complete service for aircraft and engine; transportation facilities to New York, secretarial service . . . and quick fueling service. NAMCO also provides a direct wire to the field Control tower and to Weather.

Open 24 hours a day, this corporation employs many licensed A & E mechanics. Actually, there are six licensed mech to every unlicensed one, and they are all there to offer service to corporate aircraft operators.

Next time you fly East, stop in and have a look at NAMCO's set-up. We think you'll be pleased at what you see.

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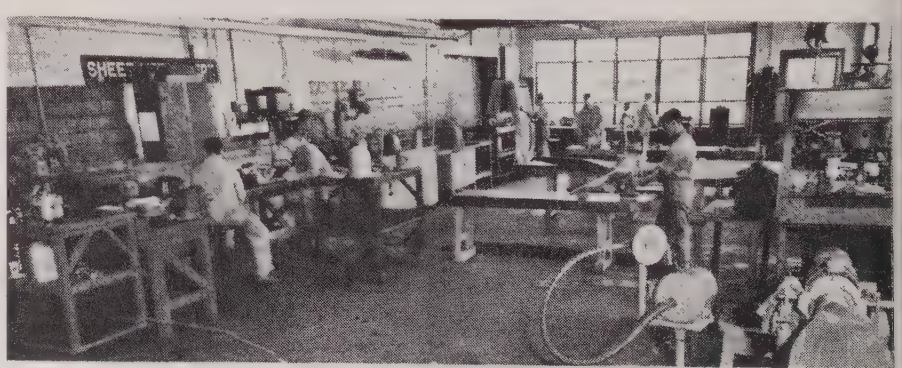

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C.A.P. News from Hq.

Woodland Patrol
Montpelier, Vermont: During the summer blast of heat that left the northeastern part of the United States gasping for breath and the ground seared and brown, Vermont's governor as well as governors from other states were forced to call a state of emergency and close the woodland sections to the public in order to lessen the danger of forest fires.

Vermont's woodlands were closed by proclamation and immediately the CAP went into action, flying patrols over the danger areas. CAP aircraft took off from every airport in the state to watch for violations. A number of minor blazes and dangerous violations of fire control regulations were reported by the Vermont Wing of the Civil Air Patrol.

Approximately 15 hours of air coverage were logged per flight with about 29 lightplanes from seven airfields. Flights were directed to previously assigned areas with 10 men assigned to each flight, six on active status and four on stand-by.

Hurricane Hunters
Miami, Florida: Several new units have been added to the CAP's Radio Net which was set up to augment presently operating hurricane weather forecasting services in Florida. September is the state's annual "scare-season" with the dreaded weather disturbances making up in the Carribbean. But the CAP forecasting units are already in action and keeping out the weather eye. Readings are available from various CAP barometers to correlate their zero settings, and the radio net is being used to transmit those readings to central weather stations. One of these stations on the receiving end of this Civil Air Patrol supplied information is the Air Force Hurricane Center where direct hurricane reports are received from pilots who are actually boring holes in the storms themselves.

Tennessee CAP on Tour
Memphis, Tennessee: Members of the Civil Air Patrol and the Tennessee Bureau of Aeronautics recently combined forces to make a four-day "booster" tour of 20 cities in the state. Assembling at Memphis, the CAP members included Chattanooga, Oak Ridge, Knoxville, Nashville and 15 other towns in their aerial swing of the state. Chairman of the tour was Major Clifford Love.

Manuals Soon Ready
Washington, D. C.: Civil Air Patrol manuals will be ready for distribution this fall to secondary schools throughout the nation offering aviation courses in cooperation with local CAP groups. These manuals are presently being printed by Government Printing Office.

First Medical Detachment
Fort Wayne, Indiana: In this age of specialization, Group 523 of Fort Wayne has come up with a first that promises to be more than useful. Trained as a medical detachment, a group under the direction of Capt. James E. Faulkner, who spent four years in the First Infantry Regimental Medical Detachment before enlisting in CAP, recently completed extensive training in first aid and affiliated subjects. Now, when disaster strikes a detachment of medics, well versed in first aid and capable of moving into an area with military precision to relieve pain and suffering and to save lives, will be ready to work with a team of CAP flyers.

Medals to CAP-ers
Orlando, Florida: In ceremonies at 14th Air Force headquarters recently, two Orlando Civil Air Patrol officers, Lt. James S. Penny and Lt. Walter E. Pooser, were presented with the Air Medal by Brig. Gen. Ralph A. Snavely, Vice Commander of the 14th Air Force. These two CAP men were awarded the medals for their participation in anti-submarine patrol missions under hazardous weather conditions during World War II.

Nebraska Wing Awards
Omaha, Nebraska: A number of members of the Nebraska Wing of the Civil Air Patrol recently received awards for their outstanding service performed during "Operation Snowbound" and "Operation Haylift" last winter. Major F. K. Mougey from CAP's National Headquarters presented Meritorious Service Awards to Lt. Arthur Feikert, Unit Commander, and to Senior Members T. Benzler, Rob't D. Engler, E. F. Hatch, K. K. Fredericks, W. C. Johnson and Rob't L. Longwell. Also awarded were Cadets R. R. Bennett, B. R. Farm, R. L. Graham, K. A. Kolscheen and T. Wren.

These 12 CAP-ers of the Kearney Flight helped load bales of hay into Air Force planes in below zero temperatures and went along on 12 missions to toss out the forage.

Three Lexington pilots also were presented with awards. These were Lt. Herschel Amrine, and Senior Members Clinton Nelson and Gene Bird. They flew missions in "Operation Snowbound."

Pilots George Manes and Donald Higgins received Meritorious Service Awards for their participation in operations.

WYOMING CADETS participated in Civil Air Patrol's two-week training encampment recently at Hill Air Force Base in Ogden, Utah

Slingshot Getaway

(Continued from page 31)

tising manager of SKYWAYS, is a veteran pilot and an old hand at showing what can be done with an airplane. In this case, he wanted to use his large front yard as a private airport. He found that he could land in it all right under most conditions. However, due primarily to high trees surrounding the property, take-offs were something else again. Something had to be added to insure safe get-aways.

Al says he got the idea for this "something" from watching 10-year-old Al Jr. using a slingshot. If rubber bands could boost a wingless, powerless pellet into full flight from a standing start, why couldn't the same principle be applied to putting extra zip into an airplane take-off? Al is not one to sit around wondering, and he launched right into experiments.

Shockcord, the same kind to be found in many a lightplane's landing gear, was the obvious material to use for the "rubber bands". After trying different sizes and lengths, Al settled on two 90-foot lengths of ¾-inch cord. Shockcord in these dimensions is not to be found in the average aircraft supply shop, but by going direct to a manufacturer, Thomas Taylor Co., of Hudson, Mass., Al had no trouble getting just what he wanted. When these cords are stretched to twice their original length, it is estimated that each exerts a pull of about 450 pounds, or approximately the thrust of a 90-hp engine.

The cords are attached to the plane at points on the landing gear just inboard of each wheel. These attachments are effected in each case by placing the upper end of an eight-inch section of "two-by-four" in front of the main landing gear strut and the lower end behind the lower landing gear strut. Loops knotted in the ends of the shockcords go under the lower strut and around the lower ends of the blocks, the tension of the cords then holding the blocks in place. When the tension has been used up, the cords and blocks simply fall away.

After experimenting with tail wheel tiedowns, it was found that none is needed. Good chocks will hold the plane, though someone should stay in the plane holding brakes just in case.

The other ends of the shockcords are also looped for placing over the two anchor stakes, about two inches in diameter, which protrude an inch from the ground 180 feet directly in front of the plane—that is, in the middle of the runway. In the unlikely event that a cord should be fouled on the plane, the loop on the stake would lift right off, since the pull at that instant would be largely vertical and also since the stakes are driven in to lean somewhat in the direction of take-off. Thus it is impossible for the plane to be pulled down by a fouled cord. Each cord has a four-foot length of ¾-inch manila rope tied around the cord and against a knot in the cord about three feet from its end. These ropes, in turn, have loops on the ends for hooking over the bumper of a car.

Al is helped with his slingshot take-offs by his wife, his son, Al Jr., and his daughter, Betty Lee, aged eight. After the chocks are securely placed, the shockcords are attached to the landing gear by means of the blocks of wood. Al slips the rope loop on one of the cords over the end of the rear bumper of the car and Mrs. Bennett drives ahead until the loop in the end of the shockcord can be placed over its anchor stake. The car is then backed up until the tension of the cord has been transferred from the car to the stake and the loop of rope can be slipped off the bumper. The process is repeated with the other shockcord. Then Al starts the engine and gets in the plane. Everything is now in readiness and Al signals Al Jr. and Betty Lee to pull the chocks. Simultaneously with the pulling of the chocks Al applies full power. Ten seconds later he is two hundred feet in the air and has traveled only three hundred feet over the ground! At this point, though, he is already far above the level of the tree tops and doesn't need it, he still has nearly two hundred feet distance in which to climb normally before crossing the trees, which are less than five hundred feet from where the chocks were pulled.

The pull exerted by the shockcords fits the requirements of short take-off exceptionally well, since the maximum force is at the very beginning of the take-off run and this force diminishes as engine speed and propeller thrust increase to their maximum with the acceleration of the plane. The assisting pull is not removed abruptly but with the greatest smoothness as the cords approach and reach their static length, which time is closely coincident to the instant the plane leaves the ground. So the job done is literally and purely "take-off assist." From the instant the plane has traveled 90 feet, it is again normally powered and can and must be flown normally. The point is that the actual take-off run has been reduced so much that take-off, gaining a safety margin of speed after take-off, and a long steep climb can all be accomplished in a fraction of the distance otherwise required. Making the gain prior to actual take-off has the marked advantage of not requiring the pilot to deal with abnormal power in flight and then, having used or attempted to use the extra power, to deal with the sudden loss of it at some unforeseeable point in his climb.

Al points out other advantages of his slingshot system. For example, to accomplish similar results with JATO would call for an expenditure of 60 or 70 dollars per take-off, would add considerable weight to the plane and would require a qualified mechanic to install the equipment. There is also the problem of dealing with the fire hazard inherent in the operation of jets, this hazard being magnified in the case of small planes, since many have inflamable coverings and the fields themselves may be covered with dry grass. The slingshot equipment, on the other hand, is inexpensive to procure in the first place, costs nothing to operate, can be assembled and operated by amateurs, and creates no such fire hazard. Furthermore, it is light and compact enough to be carried in any conventional lightplane, and is always ready for use, since it is not "used up" in one take-off as is a JATO unit.

The potential uses of this equipment, of course, go just as far as there is a need

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CONVAIR'S L-13 is called one of Uncle Sam's most versatile planes. Used for air rescue and Army Field operations, the L-13 is powered by 245-hp Franklin engine

Gauges in Easy Stages

(Continued from page 25)

much of this can be done on a budget.

There are two good ways you can chalk up this instrument experience.

First is to fly in the righthand seat with another pilot who has had a lot of instrument experience, and watch him work. Beg, borrow or steal any such ride. They pay off.

Second is to equip your own plane—or any plane you can borrow—with some kind of a hood, and fly it with somebody else checking the area to be sure you're clear of other planes. Best advice in this line that I know of is the colored plastic sheet which attaches to the windshield. Used in conjunction with goggles of another color, this plastic shield excludes all light, but does not obscure the vision of anyone else in the plane who can watch the area for you. It is also easy to fly with the shield in place so that a pilot, in effect, can "pop the hood" merely by removing his goggles.

If you can get yourself under any type hood, don't let your plane stand around for want of anything to do with it. Take it out and give yourself a dose of instruments once in a while. When you can, do some radio-range work, and then try a few let-downs. Airline pilots frequently go through simulated let-downs when they approach a field ahead of schedule, even though you might not think they'd need it.

You'll only be able to do the elementary stuff mentioned here, of course, without pretty thorough instructions. But the elementary practice is good for the man with an instrument card, or for another who may never plan to shoot for a ticket.

I figure there are several reasons why every pilot should at least become familiar with instruments:

1. If haze obscures your horizon when you're making that 180-degree turn away from the soup, you'll be able to count on the gauges to help you make the turn and return to straight-and-level flight. This is, of course, also true when the sky is flirting with minimums and your horizon fogs over.

2. Night flying (which is becoming more and more important as businessmen use their airplanes to conduct a full business day away from home, but want to get back the same night) can lead a pilot into some pretty black skies. It's simple to fly at night when you have a good horizon like that around a city. But away from a lot of lights on the ground, and with overcast skies, a pilot is virtually flying on instruments anyway.

3. On days when ceilings and visibilities are low but still above minimums, instrument technique—and especially the use of a radio—can be of immense value in doing a good job of navigating when landmarks are obscured.

4. All the practice will be a most valuable background for the day when you do take your instrument course.

5. With the introduction into the lightplane field of small twin-engine planes, (like Beech's new twin-engined *Bonanza* for six people) the biggest hazard of lightplane instrument flying is removed, and with this major obstacle eliminated, there will be a new incentive to check out on instruments.

For the other pilots—those who do go ahead and get tickets—there are specific ways in which they can advantageously use their new technique. I would say that all instrument flying in a lightplane should be touched with a 10-foot pole and used only in emergency—an engine failure could end in disaster. There are other restrictions, too. Carburetor icing is a more contagious thing in a small plane, due to the construction of most lightplane carburetors. And in the soup, it's difficult to determine whether a drop off in RPM's means carburetor icing, or just a nose high attitude. (To take care of this, read your plane manuals carefully.) Wing and prop icing conditions also can ruin a lightplane flight. Such conditions don't disappear just because a lightplane has no wing de-icers and no prop anti-icing devices. And most lightplanes don't have a lot of range—certainly not enough for a lot of "playing around" in trying to escape after weather has socked in.

With these built-in hazards to single-

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BONZO M 3 is one of newest four-placers to be developed in Czechoslovakia. Powered by 160-hp engine, it cruises at 150 mph, has a range of 620 miles at cruising speed

Slingshot Getaway

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for a short take-off. And since it is so easy and inexpensive to use, the practical extent to which it can be applied to these uses is much greater than in the case of any other system. Flying farmers and ranchers certainly can use it to good advantage. Suburbanites, such as Al, who differ from flying farmers in that they rarely have any large fields available, can find it practical to base their planes at or near their homes in fields that would otherwise be too small. Sportsmen can utilize fields formerly denied to them because of size and/or elevation above sea-level. It could ideally fill another need that is much less frequent but of infinitely greater importance to the person involved. There have been many cases of pilots deciding to land or being forced to land in small fields from which unassisted take-offs are found to be risky or impossible. In the usual case of this kind the slingshot catapult could, at minimum expense, obviate the often staggering cost of bringing mechanics and special hauling equipment to a remote spot to disassemble the plane and get it out.

The military uses of this equipment should be just as important. Army liason planes could greatly multiply their bases of operation. A Navy that has found need in the past to fly lightplanes from LST's will undoubtedly be able to use it to advantage. Any of the services may well be able to accomplish rescues which would otherwise call for expensive and, perhaps, unavailable helicopters. Similarly, mass evacuations of wounded or combat troops could be made from otherwise impossible take-off points with small planes, many of which could probably be brought up for every one helicopter available. Indeed, there is every reason to believe that take-off assistance can be given to planes of any size by the slingshot method, simply by proportionately increasing the number and/or size of the shock cords used.

You may want to use slingshot take-offs yourself. If so, you may not have a *Cub*-type gear, in which case you'll have to figure out your own attaching mechanism. Just be sure it's an arrangement whereby the shockcord *must* drop clear when the tension is used up. Here are some more tips:

Be sure your anchor stakes are adequate; you don't want a cord to snap loose and slap somebody down.

Never leave the plane without some qualified person in it when the cords are stretched, any more than you would when the engine is running.

Have brakes that will lock the wheels and keep them locked until both chocks are clear so the plane won't slew around from the pull of one cord.

Finally, *until you know exactly what it will do for the plane you are using, try your rig where there's plenty of room.*

The slingshot take-off is simple and practical; but like any other part of flying it calls for good judgment, thorough planning, and careful use. In that combination it can open numerous doors to greater utility for many a pilot and his plane.

USAF's New F-84-E

(Continued from page 15)

hat the P-51D's and H's (now F-51D, etc.) and the P-47N's n service at the end of the World War II were almost entirely ifferent from the P-51A's and P-47's in service during the arly days, for some reason or other it is less apparent to the viation public that the F-80's and F-84's in service today are reatly improved over those that were flying two years ago. A new jet is the best jet seems to be the prevailing thinking nd nothing could be more distorted. All aircraft have to go hrough the refining crucible of field service before they can e brought to a design potential performance peak.

Just three years ago, in September, 1946, a Republic XP-84 *Thunderjet* set an interim American speed record of 611 mph t Muroc, Calif. The prototype had taken to the air in Febru-ry of that year.

Two years ago the first P-84-B's for tactical use (the A nodel was actually the YP-84) were delivered to the Air Force, the first American jet fighters capable of speeds over 00 mph as standard performance, with a combat radius of ction rated at 600 miles and a service ceiling above 40,000 eet.

A few months ago Republic Aviation Corporation announced hat the newest *Thunderjet* coming off the line at Farming-dale, L. I., the F-84-E, was faster than previous models, now as a radius of action of 850 miles and a service ceiling set bove 45,000 feet, and the possible improvement limit in the asic design has not yet been reached. Despite its age (begun n November, 1944) it appears plain that *Thunderjet* advances ave kept pace with revised tactical considerations.

To understand the virtues, handicaps and tactical possi-ilities that may be inherent in a particular type of jet fighter, he F-84 *Thunderjet* provides a continuing case history for lose examination.

Basically, the F-84 is a single-engine, turbojet-powered, ingle-seat, six-gun fighter first designed for penetration mis-ions. It has a length of 37 feet, two and three-eighth inches, height of 12 feet, 10 and one-quarter inches and a wing pan of 36 feet, five inches. The low midwing of the tri-ycle-geared fighter is a tapered constant section laminar low airfoil with a 5-degree dihedral. The axial-flow power-lant is an Allison-built J-35, based on the General Electric G-180, but greatly improved by Allison through successive esign stages.

The production history begins with the first service F-84's -about 200 B models that completely equipped two Air Force tactical groups two years ago. Major improvements over he "Y" model included the installation of retractable rocket aunchers, a radio compass, a pilot ejection seat, and M-3 50-caliber machine guns with a rate of fire of over 1,200 ounds per minute in place of the slower M-2.

The next 200 *Thunderjets*, for two more groups, were the C's. The engine was an improved J-35-A-13 that was fitted vith a better fuel system. Major changes included improved omb racks and bomb release system, an access door aft of he bubble canopy for easier maintenance, and an improved uel control set-up that retrogressed to semi-manual to provide he pilot with an emergency setting.

The operations of the four groups with the B's and C's esulted in the flock of gripes expected on a new plane, ncluding some unexpected maintenance difficulties. All the rabs gathered by the Air Force and Republic technical epresentatives were then taken care of on the new F-84-D. About 150 of these were produced, enough for two more roups.

D changes included a J-35-A-15 engine which for the first ime had provision for the use of gasoline as fuel, although he conventional kerosene jet fuel was still burned in service. The plane, though unchanged in external appearance, was narkedly different under the skin. The landing gear was quipped with a mechanical shrink strut in place of the revious hydraulic-type used to contract the gear shock strut s it retracted to fit into a smaller wing housing than would ormally be required. The mechanical shrink strut was first sed successfully by Republic on the wartime P-47. A new

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Gauges in Easy Stages

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engine flying in the weather, I make it a rule to fly IFR only when weather reports indicate positively that throughout the trip there are ceilings underneath me high enough so that I can plan a landing after breaking out from the overcast in a glide.

What these ceilings should be, of course, depends on the terrain. Over plains areas like Texas, I figure 800 to 1,000 feet is good enough. But over mountains, like the Alleghanies, a good 3,000- to 4,000 foot ceiling above any reporting station is necessary. In mountainous areas the reporting stations are frequently located in valleys, and you need at least that much clearance to be sure you don't break out with a clump of pine trees on some hill top staring you in the face.

Once you break out of the overcast during an emergency, you're better off in a lightplane than you are in a multi-engine job, but this is the only time I know of when a lightplane is actually better for instruments than the big stuff.

On the Honolulu-Teterboro trip, of course, I had to go through some stuff over the Rockies that was socked in right down to the ground. But in this case, I could have always gotten out with the parachute if something had happened.

And that brings me to the two cases where I think flying instruments is actually safer in a lightplane than flying contact—or trying to fly contact.

The first case is that of a guy who, while trying to stay contact, actually begins to fly with his head half in and half out of the cockpit. In other words, he can't see well enough to fly straight-and-level by visual reference to the ground. But he's so low that he has to keep an eye outside the cockpit to pick up landmarks and to keep from running into water towers. In such a predicament he is doing double the job he needs to do. If he hasn't got a ticket, of course, the best place for him is on the ground. But if he has a ticket and enough instruments, he's much smarter, I figure, to climb up into the stuff or fly over if he can. If he stays in it, he can get enough altitude so that he can concentrate on doing nothing but flying the dials.

If he can get on top, he has a beautiful horizon and he can concentrate on his radio navigation. The biggest advantage he has on top, however, is a chance to gain altitude, and with it gliding distance to the nearest hole in the cloud deck. Breaks in the overcast, impossible to find when you're down close to the ground, frequently appear once you're on top, and with enough altitude, you've got forced landing area.

The other case where you're better off on instruments is in the case of scud. Once in a while, low scud 200 to 300 feet or lower represent impossible contact conditions. At the same time, the real ceiling may actually be up to 1,000 or 1,500 feet. Because of the low stuff, you may have to file IFR, but once you're above the broken cover of scud, you can stay below the true overcast, fly between the cloud decks, and still stay in conditions which are almost contact. You will, of course, have to squeeze between scud to get back down to the ground, but flying above them is a lot better than trying to fly in or around them on contact.

SUD OUEST SO 1110 is a two-place helicopter using a jet compressor principle. A 220-hp Mathis engine supplies the power for the compressor. Called *Ariel,* this helicopter is strictly experimental and as yet no production plans are known

The big question in regard to instruments, however, is how to get them, and then how to learn to use them. It takes money and it takes time to do both. But, like about everything else, there are ways you can do it on a budget. Suppose you've got a lightplane with only the standard instruments and you want more, but can't afford new instruments at the moment. The first thing to do is to shop around for a surplus Turn-and-Bank Indicator. With this installed, take another pilot up to help you check for other planes—and try flying a straight-and-level course on the Turn-and-Bank and hold a compass heading. Or, when you're flying cross-country, if alone, take a good look around and then fly with your eyes inside for a couple of minutes. Turn your cap visor down so you can resist the temptation to check a visual horizon.

When you've got so you can hold a pretty good compass heading, start making timed turns—two needle widths for two minutes, etc., and check your resultant headings with the standards set in the instruction books.

Then, when you've got a little more money to spare, look around for a Sensitive Altimeter. This is an important and, to me, a better indication of the all-important nose attitude than the Air Speed Indicator which is stressed in the old-time "Needle-Ball-Airspeed" advice. Together with the Air Speed Indicator, you now have a double way to visualize in your own mind the nose attitude of your plane.

An ability to visualize the relation of the plane to the horizon is the important aspect of flying blind. Don't fly instruments mechanically. Use your instruments as indicators to help you picture in your own mind, which wing is down, whether the nose is below or above the horizon, and how fast you are changing direction.

With these instruments plus, of course, a compass and a clock with a sweep second hand, you will have what is commonly called the "primary flight group". This is enough to get your plane actually licensed for instrument flying. (Two-way radio, of course, is needed as communications equipment.)

Then, when you get real rich, you can add a Rate-of-Climb Indicator and an Artificial Horizon. This last instrument, the Gyro Horizon, is the ideal instrument to fly on. The only fault I find with it is that it can make a sissy out of the best pilot. Nonetheless, I wouldn't consider doing any extensive instrument flying without it. Recently I had to make a let-down without it and was forced to rely primarily on the Turn-and-Bank Indicator. I really worked on that one, and came in sweatin'.

My *Bonanza* has the ideal instrument set-up, with all the instruments mentioned here, plus a lot of radio gear. My Turn-and-Bank Indicator is electrically driven, but the gyro instruments are air driven, so I have gear to rely on in case of failure of power source.

I don't intend to say much here about the actual technique of instrument flying. That can be picked up from the books, in the Link trainer, and during flight instruction.

As a basic rule, however, remember, to think of instruments only as gadgets which acquaint you with the outside world. Try to look through the instruments, and beyond them to visualize the

horizon and how your nose and wings line up with it. Don't let "two needle widths" on the Turn-and-Bank just be an abstract situation. Make it mean to you a specific degree of bank, and a certain rate of turn.

To help develop this concept, keep referring to your instruments while in contact flight. In basic training you were told not to fly by your instruments. That's a good rule when you're learning. But after you've got a license, forget it. When you're making a contact turn, make it on the Turn-and-Bank Indicator, and then check to see how the bank looks. This way, you'll know what the instrument means when it reads a certain way in the soup.

After you've mastered the ability to fly blind, then you will be able to concentrate on radio navigation, and on building up a background of weather knowledge. In these two fields, there is always something to learn, and it is here, particularly, that experience and time in the air really make a difference.

Next to weather flying, the most important use of instruments comes at night. I remember during the war, the Royal Canadian Air Force to which I was attached for a while, was having what seemed to be an unnecessarily high casuality rate on night take-offs. Studies finally showed that the pilots were not going on instruments soon enough after take-off and, as a result, on very dark nights they were getting wings down and plowing into the dirt. Eventually the RCAF developed a procedure whereby a pilot went on the dials while he was actually still on the runway.

Night flying has some special advantages. Just about the most beautiful sight in the world is New York City from the air at night. The parkways stretching way out into Long Island, the neon lights, the windows lit up in the skyscrapers, the huge signs on Times Square, and a number of emerald bright public swimming pools lit underwater make a picture that is fascinating to watch.

Add sights like this to the extra miles of travel you get out of flying at night, and night flying becomes an important method of getting the most out of your airplane.

While you don't need an instrument card to fly at night, there are times it gets so dark that one would surely help. If you're flying under a solid overcast and not near any built-up areas where lights on the ground can indicate a horizon, you might just as well be under the hood.

I enjoy night flying and manage to land at night once in a while on small fields lit only by automobile lights. Milton Reynolds, whom I flew around the world, has sometimes driven out to the Washington Park, Illinois, Airport at night, and parked his car pointing into the wind to indicate a runway to me on the big sod field. Ravisloe Country Club is adjacent to the field. Not bad.

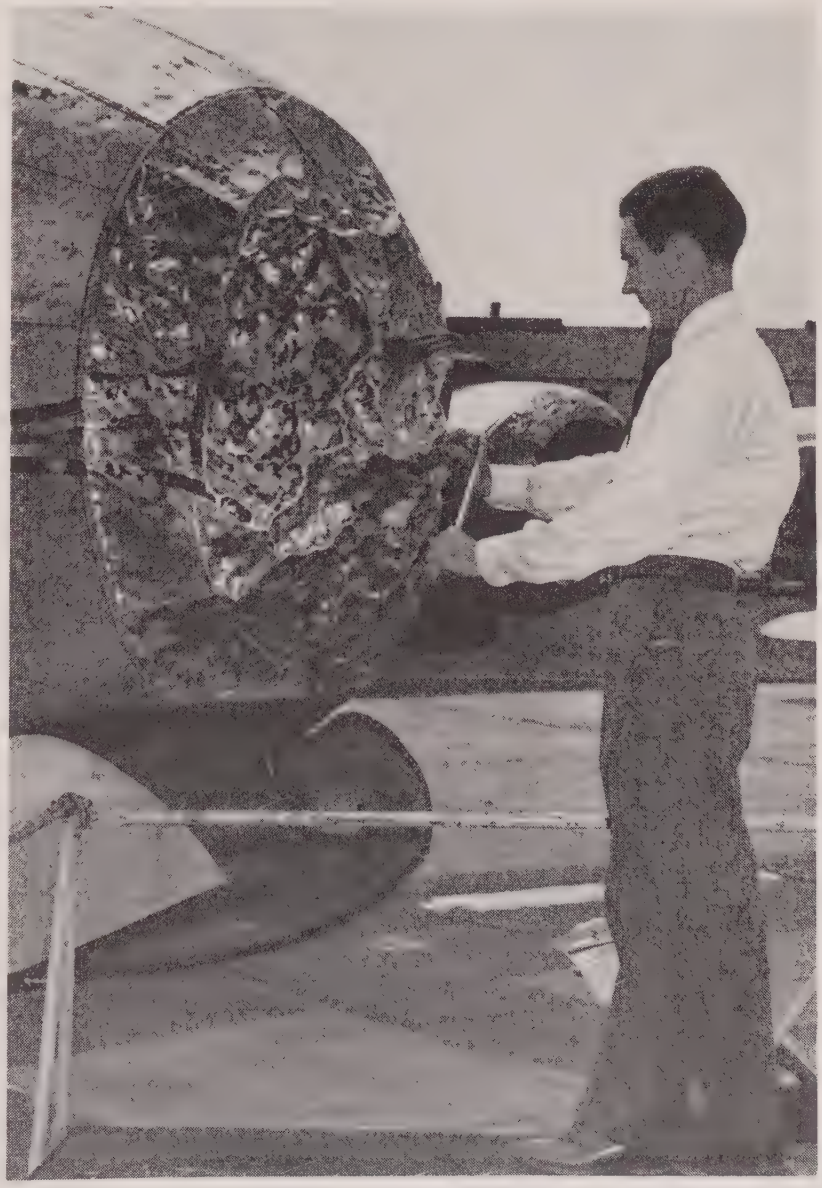
I've done the same thing on a field alongside Paul Butler's Oak Brook Country Club at Hinsdale, Illinois. Here I could taxi right up to the club house. If you ever figure on doing something like this, the best idea is to arrange for two cars facing each other, one at each end of the runway. The lights of the car you will face into will not be so bright as to blind you, and it's important to be able to visualize the length of the field. Of course, to do this you also need good landing lights. Then just come in with a little power on and you're all set. On larger fields equipped with runway lights, landings are simple. During night flying, it is wise to have flares available. They're required on passenger-hopping trips, and I figure it's a good idea to value your own neck as much as the CAA values your passenger's neck.

I've never had to make a forced landing at night, don't know anyone that has, either. But I figure probably the best thing to do is to drop one of the flares at 1500 feet, pick a field, make your approach and drop a final flare during the last circle. Highways should be the best forced-landing areas at night. You know there won't be any stone walls across them, and the color of the roadbed will help mark it for you, even in poor light.

Whether it's night flying or weather flying, however, the big thing to know is when not to fly on instruments. Experience will help indicate this, as will instruction courses, and some time the CAA will make up your mind for you. In many cases, however, especially when you are headed for bad weather while already airborne, the decision will be up to you. If it means taking a chance inside a cloud, and you don't have the rating to attempt it, take that 180-degree turn and try it on for size. I think you'll find it will fit the situation.

Pilots, Please Note

Just in case any of you pooh-pooh the power of hail, note this photo of the nose of an airline DC-6. On a flight to Los Angeles, this DC-6 ran into a hail storm near Dallas, Texas. In a few minutes, this was the damage it caused.



MORANE-SAULNIER MS 700 is a new four-place all-metal plane developed in France as a light transport for colonial service. The plane is powered by two 160-hp Portez engines, and employs a retractable tricycle landing gear, full IFR panel

Flying Coal Man

(Continued from page 33)

such freight hops find the *Navion* loaded to capacity.

There are times, too, while he's supervising things on the end of the line at Punxsutawney, that he has to hurriedly take off for Northumberland for an emergency conference with his office manager. In those instances, he's away from the Punxsutawney project only a few hours instead of a day or more.

The foresight which led Yoxtheimer to be among the first in his industry to recognize the utility of the airplane has also prompted him to keep up a constant search for good mining prospects—with distance no object. One coal project developed by the flying coal man is at Gillette, Wyoming, some 1,400 air miles away.

Except from the air, the Gillette operation is all but inaccessible. "Without a plane," Yoxtheimer insists, "my active part in the job would be out of the question. With it, I am able to keep a hand in things there as well as here in Pennsylvania.

"Take one recent morning," Yoxtheimer explained. "I was watching coal being loaded at Punxsutawney shortly after work started at 7 in the morning. Getting word I was needed at the Wyoming project, I simply hopped into the ship and flew to Gillette. I arrived in time to watch coal being loaded by the light of that same day."

Without going into his operations as a highway and bridge builder, Yoxtheimer lists enough coal-stripping uses for his plane to fill a textbook on equipment utilization.

Typical of the uses is spotting and following "crop lines" which mark the juncture of a vein of coal with the earth's surface. Very often the ground is covered with woods or underbrush, making it impossible to obtain a correct picture of the coal bed when traveling by jeep or on foot. In cases such as this the *Navion* goes to work on a low-speed patrol, ferreting out crop lines and tracking closely enough to allow Yoxtheimer to determine the most appropriate method of stripping. Similarly, locations for haulage and access roads are best spotted from the air.

Another use comes under the heading of "spot orders." The daily costs of keeping a freighter in port are overwhelming. Once the loading of a ship begins, it has to continue uninterruptedly in order for the vessel to cast off on schedule. Coal demonstrates the urgency of that loading problem. In the midst of a big freighter-loading job recently, there was a tie-up at the supplying mine. An emergency call went out to other mines for a sufficient quantity of coal to complete the job so the ship could cast off on schedule. A premium price was tagged to the plea as incentive.

First to accept the "spot order" was Yoxtheimer. His people went to work right away to get the shipment started. But then came what seemed to be disaster—the company's big power shovel broke down.

The shovel wasn't out for long, however. Yoxtheimer pulled his ship out of the hangar, gassed her up and took off for the factory some 500 miles away to pick up the necessary repair parts. Yoxtheimer was back at the mine with the shovel parts, the big scoop was fixed .... and coal was ready for shipment right on schedule. The *Navion* chalked up another pay-off trip.

"Not only did I get the premium price for my coal," mused Yoxtheimer later, "but ever since then I've been getting repeat orders whenever other emergencies of this 'spot order' type show up, and I'm frank to admit that the whole feat would have been out of the question had I not had my own plane.

"One evening at dinner, Fred Raffeto, proprietor of the restaurant in Punxsutawney where I'm in the habit of eating, helped me to better appreciate my airplane," George Yoxtheimer recalled to your reporter.

"The incident really began that morning when, as usual, I had breakfast at Fred's. Full and happy with a warm platter of ham and eggs inside me, I went out to the strip only to be told of a machinery breakdown. Knowing the necessary part in this instance could be obtained in New York City—250 miles away—I flew there in a hurry. By the time the mechanics had the broken part removed from the ailing equipment, I was back at Punxsutawney with the replacement.

"That noon, I sauntered back over to Fred's for lunch. My relaxed state was short-lived, however, for no sooner had I eaten and returned to work than there was another breakdown. This time I located the repair parts at Detroit and so flew out there after them.

"As though I hadn't left Punxsutawney since breakfast, I dropped in at Fred's for dinner on my return from the Motor City. Fred sat down next to me to pass the time of day and ask how things had gone since our morning's conversation. When I told him the places I had been in so few hours while he himself had never stepped foot out of his place of business, he was so amazed he hurriedly hunted up some old geographies. Together we looked over the maps—and, frankly, I was as astounded as Fred at the way my airplane had made fun of distance."

A simple chart worked up by the flying coal man clearly proves the time-saving aspects of flying your own plane for business. Three point-to-point routes, other than from Punxsutawney to Northumberland and Philadelphia, over which Yoxtheimer flies his Ryan *Navion* every month are listed. Of interest are the miles saved in traveling *direct* by air. Figuring *Navion* cruising speed as roughly four times that of an automobile over these routes, the remarkable time savings are more readily apparent.

Being as enthusiastic a businessman flyer as George Yoxtheimer is, it's only natural that his whole family is enthusiastic about flying, too. The oldest boy, 17, already has his private ticket, and the number two son is learning fast. During the summer vacation a third lad, 11, flies with his dad on regular business runs. After his father gets his ship off the ground, the youngster takes over and flies it to their destination.

Still another boy, 4, loves air-riding, too. He usually goes when his mother is along, which is as frequently as she can find time to be.

Yes, all the Yoxtheimers are avid air-travel enthusiasts . . . and particularly so when it's a junket with Dad at the controls of the business *Navion*.

CHART developed by Fred Yoxtheimer proves utility of personal plane travel, its value over the automobile

	Approx. No. Round Trips Per Month	Approx. Air Mileage One Way	Approx. Ground Mileage One Way	Av. Trip Time by Plane	Av. Trip Time by Car
From Punxsutawney To Sunbury, Pa.	4	114	160	48 min.	4 hrs. 40 min.
From Punxsutawney To Harrisburg, Pa.	2	140	165	1 hr.	4 hrs. 50 min.
From Punxsutawney To New York City	1	250	320	1 hr. 45 min.	9 hrs. 2 min.

Holiday on Wings

(Continued from page 18)

for the next six months we would be permitted to fly anywhere in Mexico without further customs clearance. He also added a rather sour note by informing us there was no 80 octane fuel at the field. Noting the fuel left in the *Bonanza's* tanks, I wasn't too concerned because I knew I had enough gas to get us back to Brownsville, Texas.

A taxi took us into town, some eight miles, and deposited us at the Hotel Colonial. Our taxi ride cost us 15 pesos, and a large room with bath, telephone and twin beds at the hotel cost us 35 pesos a day—$5.25 in U. S. currency. These are rates similar to those charged in the States.

Just a couple of days in Monterrey netted us gifts for friends at home, a Professor Garza who showed us the sights and did all our translating for us, and a new flying friend. It didn't take us long to discover that Fernando E. Maguerza, our host at the Hotel Colonial, was himself a pilot who owned a *Cub Cruiser*. In the course of one of our conversations, I casually mentioned that if I were able to get any 80 octane fuel, I'd fly on to Mexico City.

Maguerza's eyes shone as he hastily exclaimed we'd be able to buy 80 octane gas all the way down to Mexico City. Then hustling us toward his car, he suggested we go immediately to his field where there was 80 octane available. That was okay by us, so Eleanor and I rode out to the big airport with Maguerza. We unstaked the *Bonanza* and flew Maguerza over to his field on the outskirts of Monterrey.

I brought the *Bonanza* in on a rock-strewn 1800-foot runway with good approaches, then taxied over a bridge to a concrete ramp for service. Believe me, the service we got at that small field would have done credit to any airport in the USA.

Gas was pailed out of a barrel, but it was put through a chamois. We paid for it by the litre which in American money amounted to 35 cents a gallon. I hangared the ship there for the night.

After we'd rolled the Beech under cover, Maguerza showed me around the place and explained how the field had, at one time, been a large commercial field, how a change in government administration has resulted in the field's being plowed up and seeded to cotton. Maguerza, it seems, had managed to get the short runway and the land on which the hangers stood, and it was his plan to promote civic interest in his project and eventually develop a real field for private flying . . . and a field that would include black top runways, hangars, shop, pilots club and good food for both Mexican and American flyers.

The next day we taxied back out to Maguerza's field and I flew the *Bonanza* out of the 1800-foot strip, alone and under a 1,000-foot overcast. Back at the big commercial field, I spent the forenoon getting an oil change and trying to find maps for Mexico City. With no luck on the maps, I finally climbed up into the nose of an American Airlines C-54 and bought two maps, WAC Taniahua Lagoon 589 and Sierra Madre Del Sur 643, from the pilot.

After paying my 5 peso landing fee, I filed a flight plan to Mexico City via Victoria and Tamuin.

With the *Bonanza* all loaded and ready to go, I discovered I was out of pesos, so spent the next hour or more trying to get the airline office or anyone to change a $20 Travelers check into 136 pesos. Just as I was about to give up and announce to Ellie that we'd have to taxi back to the hotel, get the money changed there, and then plan the Mexico City trip for another day, one of the airline mechanics rounded up two other fellows and between the three of them they managed to scrape up our 136 pesos. Saved again!

Just at 2 o'clock we lifted our wheels from the Monterrey airport and were on our way.

Reading check points from a World Aeronautical Chart in this part of Mexico isn't easy, but Eleanor with her needle-point navigation did a swell job. Over a village at the fork of the Rio Morelos river, I tuned in Victoria radio on 233 kc's and we rode the beam in from there. Every few minutes I called the range station on 233 to see if I could get a weather report, but . . . no weather.

(Continued on page 52)

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TRAIN IN MIAMI--AIR CAPITAL OF THE WORLD

USAF's New F-84-E

(Continued from page 45)

exterior lighting system, a new radio panel and a semi-automatic sight for use with guns, rockets or bombs, akin to a fire-control system, eliminated some pilot problems. Structurally, the 84-D included new, lighter weight fuel cells that saved 120 pounds per aircraft while the wings were beefed up with heavier skin for high Mach number flight. The pitot tube was shifted from the vertical fin to the nose and the aft radio compartment was sealed and ventilated externally. More access doors, along with a hinged auto-type fuselage gun deck cover, were provided to ease maintenance and servicing. The battery installation was also re-designed for easier service. Although the aft section of the fuselage is disconnected by means of only four bolts to provide for engine removal, that expedient could not be resorted to every time it was necessary to work on only certain sections of the engine and its accessory system; the main reason for the addition of some of the extra access doors.

A jettisonable bomb pylon improved trim and release characteristics for ground support use of the airplane while a new landing gear door lock prevented unporting in sharp pull-ups. The addition of fins to the wing-tip tanks allowed unrestricted flight maneuvers with tip tanks.

Republic now has an active contract for over 400 more F-84's, beginning with the new E which started off the line in May of this year. The factory is also "modernizing" all B's and C's to add all the changes made in the D model, after which they will again qualify as first-line fighter aircraft and, presumably, be used to equip Air National Guard units as well as Tactical Air Force units.

The faster F-84-E, intended for ground support, interceptor and escort-fighter work, has a 500-mile ferry-range increase to 2,000 miles and a new top speed just under that of the fastest new operational jets. The engine is a J-35-A-17 with a guaranteed dry thrust of 5,000 pounds compared to the 4,000 available in the first 84's. All radio equipment is now in the compartment aft of the canopy while the fuselage has been lengthened 15 inches for more cockpit room for pilot comfort and for the installation of additional nose radar.

The cockpit has the latest version of the AN psychologically-proven lay-out and also includes a better air-conditioning system and a longer canopy. All maintenance problems have been eased and aided by additional access doors, bringing the total for the aircraft to about 180 of all types.

JATO mechanisms for two 1,000 pound solid fuel units under the aft section of the fuselage are retractable and the used bottles can be released at up to 400 mph. Additional equipment changes include quick disconnects on all main-operated elevator platforms for the two big batteries which now provide for automatic engine starting.

One unique change is in the stress load limitation of the wings. The 84-B's, C's and D's were rated at 11 g's Ultimate, with 7.33 limit as called for by the Air Force for jet fighters, but the "E" has been designed for a 14 g Ultimate rating, which is higher than any fighter that's been built up to now. As previously pointed out, the wing structure is strong enough to allow it to be the only jet fighter without flight restrictions even when carrying tip tanks, an obvious asset in combat.

Those are the major changes that have already been made in improving the F-84 to keep pace with tactical requirements. There are other factors, inherent in the original airframe design, that have made it possible for Republic engineers to further embellish this fast, versatile fighter.

The *Thunderjet* was originally conceived when the Air Force asked Republic to re-design a P-47 *Thunderbolt* in order to conduct tests on a new General Electric axial-flow jet engine, the TG-180. Design conferences between Republic and the Air Materiel Command resulted in a decision to design an entirely new airplane for that purpose in November of 1944, but changed planning delayed delivery dates and it was after World War II was over before it was finally ready for testing. Alexander Kartveli, Republic's vice president in charge of engineering, directed the design work, assisted by company engineers F. Mulholland, W. O'Donnell and C. H. A. Hartley, while Col. Marshall S. Roth was engineering officer for the project.

A design analysis of the F-84, prepared by C. E. Pappas, Chief of Aerodynamics, Republic Aviation Corp., with the assistance of members of Republic's Engineering Department, reveals many of the interesting characteristics of the plane, stressing problems that confound aeronautical engineers in high-speed plane design.

"The power of the F-84 airplane is sufficient to afford a high speed in excess of the critical Mach number of the airplane," Pappas says. "Since very little information was available at the time of the design in the super-critical flight range no special provisions could be made at the time of the design to insure the normal operation of the airplane in this regime. It was known, of course, that extreme cleanliness of design, great caution in detail material, such as fillets, should be exercised. It was then very gratifying to see the airplane exceed its critical Mach number. However, at higher Mach numbers buffeting is encountered together with a definite nosing up tendency on the part of the airplane. The decided nosing up tendency of the airplane at super-critical Mach numbers was considered surprising at the time since most airplanes are known to dive in with the onset of severe compressibility effects. This feature is desirable since it is basically a safety feature of the airplane recovering as it is by itself from compressibility dives."

The delicacy of Pappas in saying that the nosing up feature is "desirable" would be strengthened by an "amen" from one Air Force pilot who blacked out in a high Mach number dive in an F-84 and recovered his senses at an extremely low altitude to find that his plane was now in a climb away from the very solid earth it had previously strained towards.

The fuel tank set-up in the 84 is interesting because of the way maximum quantities are carried in the slim frame. Fuel is contained in six tanks: two wing tip, two wing and two fuselage tanks. Each of the wing tanks is separated into five cells outboard of the landing gear between the front and rear spars. Fuel is fed to the engine from the main fuselage tank which in turn is kept filled by transfers from the other tanks. Originally it was intended that the tanks should empty in the following order: 1) wing-tip tanks, 2) top half of forward fuselage tank, 3) wing tanks, 4) bottom half of the forward fuselage tanks, and 5) the main tank: that order being followed mainly to keep center of gravity travel within limits since the forward fuselage and wing tanks produce large c.g. variations as they empty. This system required a complicated mechanical-electrical control system which was later simplified by the employment of a balanced fuel-flow system from the wing and forward fuselage tanks, which has been "remarkably trouble free," ac-

USAF'S four-jet bomber, B-45 *Tornado*, can be completely refueled in 30 minutes, thanks to its single-point fueling system. Usual time required is four hours

cording to Aerodynamicist C. E. Pappas.

The pilot can also manually set his selector valve to drain the wing or forward fuselage tanks directly into the engine if the main tank system malfunctions, this change first coming on the F-84-C as previously listed.

The one feature of the F-84-E that makes it a standout as a prospective ground-support aircraft is the extremely strong wing construction. Flight tests have shown that when the plane is equipped with wing-tip tanks with the new stabilizing fins (to correct an abnormal vertical force and pitching moment which twisted wings on several types of jets even when the tanks were empty) the airplane structure meets all flight conditions safely with or without the tanks. The clean airplane has been dived to approximately 620 mph at sea level and pull-ups have been made cleanly at various g's. With empty wing-tip tanks it has made pull-ups at various g's at an indicated air speed of 600 mph, besides passing other service tests at various g's with full and partially full tip tanks.

Present F-84 armament consists of six M-3 .50-caliber machine guns (four in the nose section and one in each wing), two droppable bomb racks and four retractable rocket launchers, each carrying two 5-inch HVAR rockets. Rockets have been fired singly and automatically successfully at speeds from 300 to 550 mph Indicated, with no apparent effect on the airplane control. The jettisonable pylon-type bomb rack has been added to cut the amount of trim and control force necessary after 500- or 1,000-pound bombs are dropped and this installation is considered highly successful in making the F-84 an adaptable and accurate fighter-bomber.

Secrecy shrouds the still-experimental triple-threat firing sight with which new jets are being equipped, but the electronically-operated semi-automatic installation for firing guns, bombs and rockets is believed able to supply the answer to the high closing-speed problem that has complicated air-to-air and air-to-ground fire in jets.

While the armament set-up for the F-84 at present only mentions the amounts of rockets and bombs listed above, it doesn't take expert speculation to figure that the present wing design is capable of accomodating extra racks of rockets and bombs for ground support or provision for more external fuel tanks for extreme long-range escort or penetration purposes.

The full potential of the airframe does not appear to have been reached as far as critical Mach number flight is concerned, since tests are still proceeding in a design effort to clean up canopy and fillet details and improve control surfaces to extend the speed range and delay the onset of buffeting of the airplane which can absorb more thrust power as its powerplant output is further increased.

It can readily be seen, with the F-84 as a prime example, that any jet fighter with a basically sound design can be extended, modified and improved as tactical requirements change in the future and as more knowledge is gained about the criteria for high-speed flight.

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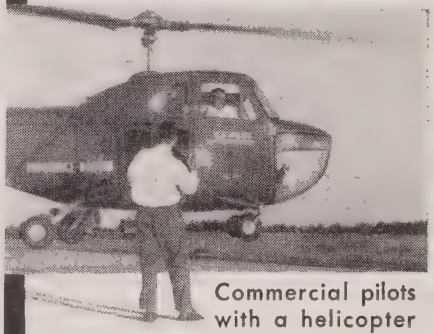

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Holiday on Wings

(Continued from page 49)

Finally, when we neared Victoria, we ran into broken scud and a lot of headwind. Not knowing exactly what was ahead and getting a bit low on gas, we put into the first field we spotted—an emergency field outside Victoria.

The runways at this field were very narrow and covered with rocks the size of your fist. I taxied to the weather station at the edge of the field and asked its lone occupant if there was any 80 octane fuel available. There wasn't, but a small field eight miles to the west would have it, he reported in perfect English.

Eleanor and I took off again and flew west toward the base of a mountain range with peaks stretching 13,000 feet skyward. Here, at the base of the range was Victoria, and nestled on a tiny plateau was the airfield.

I lowered the gear on the downwind leg and was just turning on the base leg when I noticed horses grazing all over the field. Just as I leaned over to flick the gear switch and grab the wheels back up again, I saw a couple of small boys driving the horses off the runways, so I went on in. I came in with full flaps on the shortest runway of my life. I'm sure it wasn't more than a thousand feet long . . . and coming in it seemed a lot shorter than that.

On the ground, I taxied over to a roofless adobe hangar filled to capacity with tiny airplanes. When a small barefoot Mexican boy ambled around to my side of the ship, I pointed to my gas tanks, then waited to see whether or not the pantomime would work. It did. A barrel was rolled out through the dust and rock, and leaded gas pailed into both tanks.

When the gassing had been completed and I'd paid for the fuel (still 35 cents a gallon), I started to climb back aboard the *Bonanza* but was stopped by a tug on the arm. The boy motioned me toward the hangar, so I followed him.

In the hangar, he squatted on the dirt floor and began filling in a form. Then I knew—the small matter of a landing fee had to be paid. I gave the lad five pesos, grabbed the receipt out of his hand and started back toward the plane. Overhearing the boy mutter something that sounded like *Navion*, I went into the motions this time and led him to the plane. There I very definitely pointed out the word, *Bonanza*, and pronounced it for him several times, just to make absolutely sure we understood each other.

By more sign language I asked which way to take off. The wind was down the short runway at 10 mph, the elevation was 1300 feet, the time was 3:45 in the afternoon . . . and the temperature was 85 degrees.

The boy shook his head. He didn't even grunt so I didn't know whether he meant "I don't know," or "who cares."

There was a longer runway, but it was crosswind and it started back where the horses were grazing and crossed a road up ahead. It looked much too rough and rock-studded for me, so we taxied back to the end of the short runway.

I put on 15 degrees flaps, locked the brakes, ran the engine up with prop in low pitch, then took off hell bent for a short-field take-off. Halfway down the runway, I felt we were moving too slowly, so decided to get off the throttle and try it again. Instead, however, I opened her wider and held the prop in full low pitch. We were still on the ground at the end of the runway and I did everything but get out and lift her up myself. We shot down a little rocky hill and were heading straight for a stone wall when the baby finally broke loose from the ground. We cleared that wall by inches . . . and no more. I flicked the gear switch and pushed the plane's nose down into a tree-choked ravine for a little more air speed. The *Bonanza* picked up and we finally got out of there.

After getting a little altitude I drew up enough courage to look over at Eleanor. She was sitting there placid as a plum . . . but I wouldn't have given you a dime for her thoughts at that moment.

We flew the beam to Tamuin over a green trackless wilderness. Nearing Tamuin, we spotted a triangular strip close to the mountains, but could find no indication on our map of an airport. It was almost 5:30, so we decided that in the face of headwinds, we'd either sit down there at Tamuin or fly back to Victoria rather than attempt the flight at that late hour over the mountains to Mexico City.

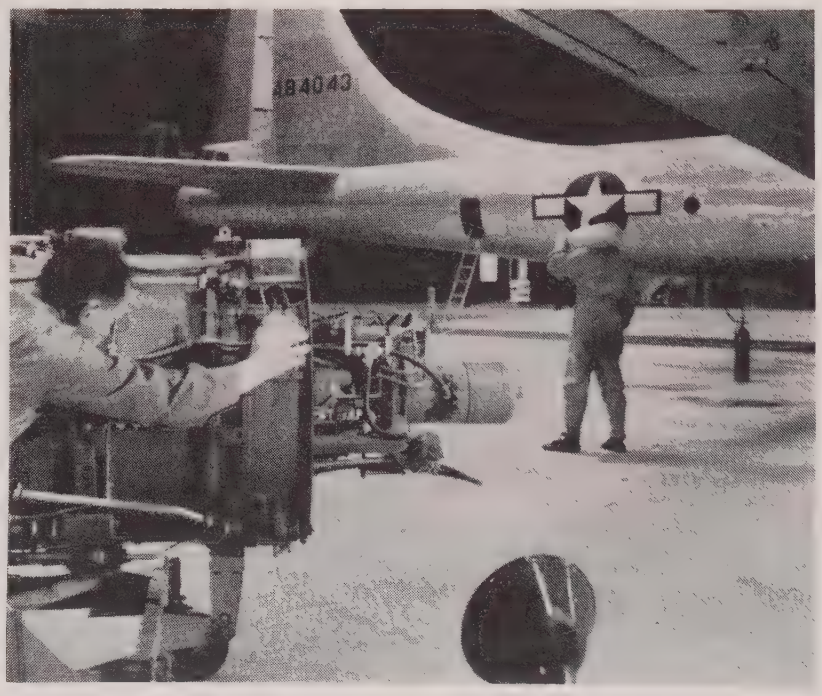
I called Tamuin radio on 371 just as we passed over the Santa Marea river, but . . . no response. With the beam loud in my ears, I pulled the ship around and followed a road that, according to the map, would lead us into an airport. But . . . no airport! We followed the road for some time and were just about to turn back and head for Victoria when Eleanor spotted a one-way strip off to the right of us. I dragged the area and when it looked okay, pulled around and made a straight-in approach. It was almost 6 P.M. when the *Bonanza's* wheels touched down on the narrow dusty runway. We taxied up a gravel roadway to a weather station, and I got out to see whether or not gas was available

Three young Mexicans, all weather attendants, greeted us with the word that while their field was an airline stop, no gas was available. By that time it was too late in my estimation to try and make it back to Victoria, so we stayed there all night. Fortunately for us, the boys had extended the invitation, and I think they were as pleased to have two new faces around as we were to have a place to stay.

The weather station was a tightly screened building made of stone and equipped with modern conveniences. At one end of the building was all the radio equipment. This was flanked on one side by a neat kitchen with gas stove, electric refrigerator, big electric fan, etc.; and on the other side by a comfortable living room, the walls of which were gaily lined with Mexican calenders, pictures of senoritas in shorts, etc. Out on a screened-in porch were hammocks, chairs, etc. Two bedrooms, each with its own bath, were at the back of the stone house. The walls of these rooms, too, were lined with gay decorations . . . mostly American and Mexican college pennants. At the rear of this building was an adobe which housed two Indian girls who did the cooking and the housekeeping for the boys.

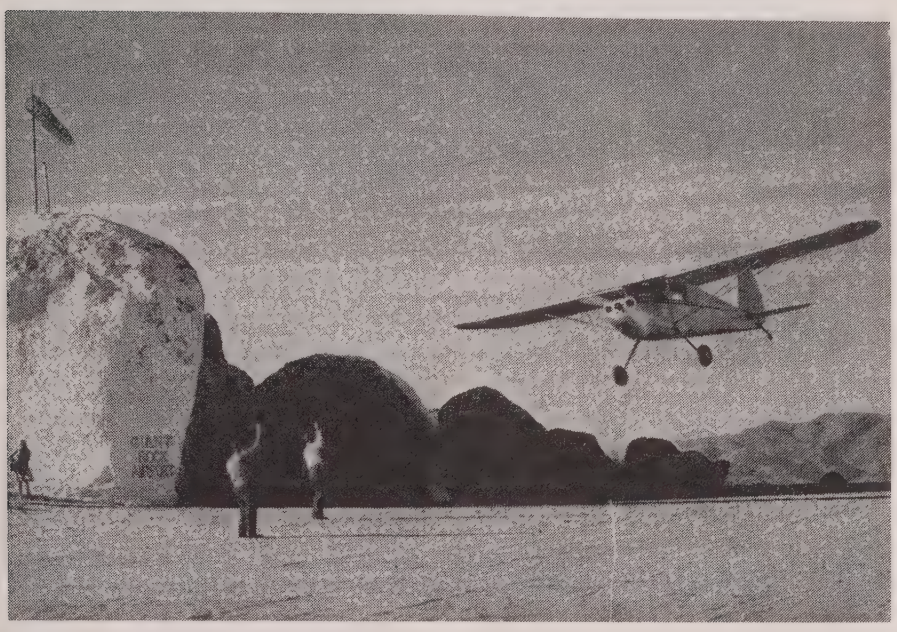
The boys moved into one bedroom and alloted Eleanor and me the remaining one. After depositing our luggage there, I sent

(Continued from page 54)



FLIGHT RESEARCH plane in extensive use by General Electric's Flight Test Center is a specially equipped B-29. Used by G-E engineers as part of their flight research program for the Air Force, the B-29 carries a special gear in its bomb bay from which is slung a jet engine to be tested for performance at high altitude. In photo above, a jet engine is being readied for flight

Desert Airport



CESSNA FLYER wings into Giant Rock Airport located 30 miles NW of Twentynine Palms, Cal.

Like the giant rock castles of old, here's a West Coast flying resort with a history of international intrigue and a bonafide ghost.

Located just 30 miles northwest of Twentynine Palms, California, Giant Rock Airport has a past unequaled in California. In pre-war days, this desert dry-lake was a favorite overnight stop of Los Angeles "Sunday" pilots. In those days, Frank Critzer kept the sandy airport in shape and did some mine prospecting on the side.

The elderly Mr. Critzer had a radio set and, early in the war, was approached by three deputy sheriffs for not registering as an enemy alien. The German prospector then "holed up" in his living room excavated beneath a 75-foot boulder that weighed almost 75,000 tons. When the deputies came to question him, Critzer calmly blew himself up with 30 sticks of dynamite. Later, a two-way radio set was found secreted in the rocky hill directly west of the airport.

That, then is Giant Rock Airport's somewhat questionable past. Today, however, is a different story.

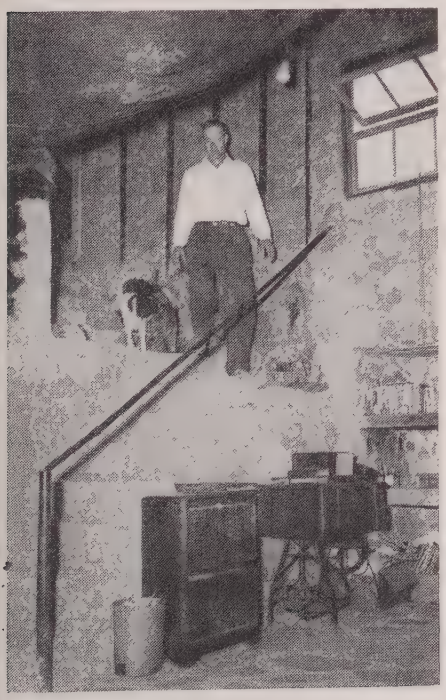
The field is again open to visiting pilots, and George VanTassel is the manager. Mr. VanTassel spent four and a half years on the flight line at Lockheed, and built up a craving for the wide open spaces. Finally, after two years of wrangling, George obtained a lease on Giant Rock Airport and moved his wife, three daughters and himself out to this desert retreat.

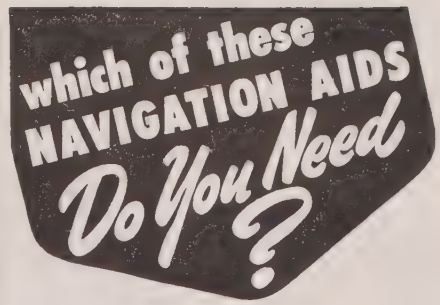
His 5300-foot airport is CAA-approved. He has a pint-sized cafe and a juke box adjoining a large cement square for dancing. The field's most popular asset, however, was supplied by Mother Nature herself. The 400-foot high pile of boulders sitting next to the runway will keep amateur "rock hounds" busy for years. The rocks are popular, too, with camera fans who attempt to duplicate the rocks' magnificent coloring on their color film.

The airport at Giant Rock is really isolated from the rest of the world. The three VanTassel children travel 64 miles a day going to and from school at Twentynine Palms. Water has to be trucked in a distance of 14 miles and the nearest phone and post office is 16 miles away, at Joshua Tree.

But for relief from the speed and confusion of the city, many a pilot flies to Giant Rock for a quiet weekend.

AIRPORT manager is George VanTassel, shown here on steps to pilots' room under the rock





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Holiday on Wings

(Continued from page 52)

a wireless to Mexico City, cancelling our flight plan. With all that taken care of there was nothing for us to do but sit on the porch with the boys and wait for the next bit of excitement—the arrival of a DC-3 scheduled to make a stop there early in the evening.

Long about 8 o'clock, we picked up the sound of the airliner's engines, and in a few minutes it came into view out of the growing darkness of night. The pilot made a steep turn over the field, then came down in a short fish-tail approach. The Companie Mexico Aero Servicio pilot checked in with our hosts, he talked for a few minutes, and then was up and away. Next stop—Mexico City.

In the meantime I had noticed a fellow studying the radio equipment on our *Bonanza*. I sauntered out to the ship and introduced myself. When in the course of our conversation I mentioned the difficulty in getting 80 octane gasoline, he took my map and marked the position of his own airport . . . 12 miles northwest of Tamuin.

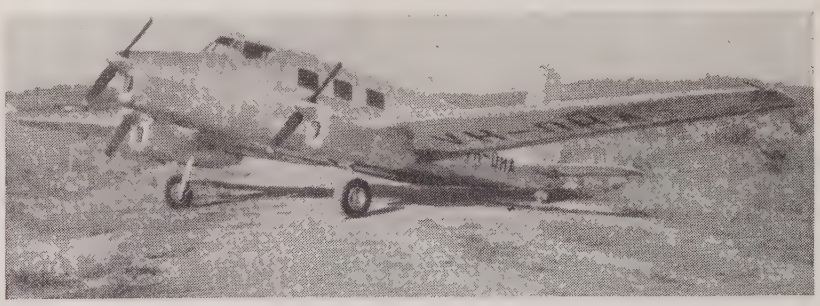
The boy's father owned a sugar mill nearby, and also a *Navion*. He kept 80 octane fuel at his strip especially for visiting pilots. I wrote down the boy's name and address—Hector M. Saenz, of Ingenio Xicotencatl, Tamb.—and promised I'd buzz over to see him. With that, the boy climbed aboard his *Navion* and, using only his landing lights for illumination, made a beautiful take-off.

The next morning after a breakfast Eleanor and I got ready to leave. Before we pulled out, however, one of the boys gave me a short course in Mexican radio. It seems that in Mexico you dial one wave length for beam transmission, and another wave length for weather reports. Weather reports are given in English on 3105 kc. Obligingly . . . and I suspect somewhat mistrustful of my being able to remember all he'd explained . . . he typed out the radio ranges for me.

Mexico tower	278	M E X
Weather (in English)	3105	-- . -.--
Mexico radio range	359	-- . -.--
Actopan Radiolocalizer	239	ATO .- - ---
Tamuin Radio Range	371	TMN - -- -.
Victoria Radio Range	233	CVM -.-. .--. --
Monterrey Radio Range	400	MTY -- - -.--
Monterrey Tower	3105	

With the list in hand and all our luggage back aboard the *Bonanza*, we went out to the ship. The temperature inside that cabin must have been up in the high 90's. The ship had been sitting out in the more-than-warm Mexican sunshine.

At exactly 8:30 A.M., the *Bonanza* lifted her wheels off the dusty runway and began the long climb to the 12,000 feet the flight plane called for. The outside temperature was terrible and before we had gotten up to 5,000 feet, the oil temp on the panel was in the red. We bored our way up over the mountains through a broken layer of cottony clouds. Mountains loomed up large on either side of us but we were right on the Actopan beam. The engine iced up a bit and ran rough during the climb, but a little carburetor heat was the sure cure for that.



DE HAVILLAND'S newest transport is this tri-motor all-metal cargo- or passenger-carrying *Drover*. Very wide-track landing gear is for rough-field operations

At 12,000 feet I leveled off even though the mountains still seemed mighty close. Through the cloud layer we looked straight down into fantastic gorges. Here and there green fields mingled with tiny Indian villages shut off from the rest of the world by precipitous walls of rock.

Once over the last mountain range, the oil temp slipped down out of the red into the green. We were over the Actopan radio so I called for weather at Mexico City . . . and got music. I tuned up and down the dial, but picked up nothing except that music. Spotting an airliner in the distance, I followed it around a mountain to the great dry lake and Mexico City. Calling the tower on 278 kc., I got my landing instructions, and headed on in.

On the down-wind leg we flew into a cloud of dust that seems to lie perpetually over Mexico City. I switched on the navigation lights and plowed on through. We came out of the stuff over an army field. I called the tower to make sure I was okay. Still on a go-ahead from the tower, I picked out the righthand runway and started in. How I ever missed noting the stuff that runway was littered with, I'll never know, but all of a sudden I found myself practically on top of a mess of bituminous paving material, power shovels and other such equipment. I shoved the throttle wide open and went around again, accompanied by the pleading voice of the tower operator frantically ushering me to, "Please, Captain, use only the left runway!"

This time I made it okay and came in nice as you please on my first really high-altitude airport . . . 7300 feet above sea level. We taxied up in front of one of the most beautiful administration buildings I've ever seen. Just as I cut the engine, the tower man came back with, "*Bonanza* 47, we have cancelled your flight plan from Tamuin. You are welcome to Mexico City. Please hold your position and wait for custom officials."

Within a few minutes white-jacketed attendants surrounded us and with them was Jose Ceciliano, a very obliging and hard-working interpreter whose duty it is to meet American flyers. We spent the next several minutes having our luggage inspected and papers and passports checked. That done, I left Eleanor in the Ad building, paid my 25 pesos landing fee, then went out to see about hangar space for our Beech baby. While a policeman held up Sunday traffic, I taxied the ship across a highway to the hangars of Aero Servicio. There Jose instructed the attendant to gas and hangar the *Bonanza*.

The ride from the airport into Mexico City was one of the most beautiful rides Eleanor and I had ever enjoyed. We drove down magnificent boulevards past streamlined skyscrapers, lovely parks and colorful gardens, to our hotel. For 35 pesos we got a room as large as a suite back home, luxuriously furnished and complete with bath, telephone and baskets of flowers. A large ceiling-to-floor glass door opened on a veranda overlooking a beautiful patio.

For the next several days we toured Mexico City and the surrounding countryside. Many of the other tourists whom we met had driven down in their own cars, and when we compared notes on travel, the *Bonanza* way proved by far the best. Most of the auto-traveling tourists, in describing their trip, would lapse into gasps of exhaustion as they explained how they had had their luggage and possessions, checked re-checked and double checked every few miles on the way down. It seemed to us that the automobile tourists always needed about two days to rest up before they even ventured out on the Mexico City streets.

For the first day the high altitude bothered us . . . neither Eleanor nor I seemed to have any pep. But the second day we felt swell and so made up for lost time.

Finally the day came when I had to count our remaining pesos. I found our money was fastly slipping away. This indicated one thing . . . we'd better head back home.

The next morning we regretfully taxied back out to the airport and unhangared the *Bonanza*.

I filed our flight plans, wired Brownsville, got the weather reports all neatly typed out, and taxied out for take-off. A tower attendant collected 12½ pesos for use of the tower, and then gave us our take-off instructions. I set the prop for high rpm; mixture, full rich; and carburetor heat, "cold."

Once in the air, I flicked the gear "up." But . . . no whine! To our amazement, the red arrow at our feet remained "down." By this time we were wallowing around in rough air laden with dust and big aircraft.

I called the tower, explained my predicament and they lost no time in making a place for us in the traffic pattern. Back on the field, I taxied over to the Aero

(Continued on page 59)

Miles vs. Knots

By CARL M. REBER

Have you been a bit confused lately when the Weather boys give you the upper air wind speeds in *knots* instead of miles per hour? Don't let it upset you, it's just part of a number of changes in meteorological practice arrived at by international agreement, and it isn't as serious a change as it may seem.

Possibly many ex-Navy men will be happy to use knots again, but don't get the idea that the knot was adopted simply because the Navy men out-numbered all the rest at the Conference of the International Meteorological Organization which recommended the change. The International Meteorological Organization has been in existence for many years. Its recommendations are based on careful study of the problems at hand. It has been guided by truly democratic principles, and it can be safely said, has been almost entirely free of political and economic influences.

Throughout the years, some countries have used meters per second, or kilometers per hour as a unit of wind speed in the upper air. Others used the knot, and of course the United States and some other countries have used miles per hour. So long as we don't wander very far from home, the mile per hour is fine. But suppose you decide to fly to South America, and in response to an inquiry you get: "Si, Senor, she blow from 80° at 30 kilometers." The next fellow may say: "The wind's from 80° at 40 meters per second." Then what? Perhaps not many of us will be flying personal planes to foreign countries, but have you ever thought of the difficulties that lack of uniformity in the reporting of upper winds could cause to international flying? Certainly there has been need for standardization.

As of January 1, all Weather Bureau observations and forecasts of upper air wind speeds have been written in *knots*. Admittedly, the knot is a compromise. Considering the many countries that are members of the International Meteorological Organization which recommended the change, it is remarkable that the knot was found to be acceptable to most all concerned and also capable of being adopted without any serious difficulties. It so happens that two knots are roughly equal to one meter per second, or four kilometers per hour. Hence, this change presents no serious problems to the countries that have been using the metric system. We fellows that still insist on using miles per hour really do not have much reason to complain about the change. Just increase the speed as reported in knots by 15 per cent and you have miles per hour.

Now let us suppose that we do not care to make this correction, but have somehow convinced ourselves that the knot is the same as a mile per hour. Assume for a particular flight that there is a direct cross wind of 50 *knots*. With a 100-mph airplane, we will have a ground speed of 82 mph and the drift angle will be 35°. Computing our ground speed and drift angle on the basis of 50 mph instead of knots we find that we would have a ground speed of 87 mph and that the drift angle will be 30°. Hence, because of our assumption, we have introduced an error of 5 mph in ground speed and 5° in the drift angle. Remember, however, this is a rather extreme case.

If the wind is 45° off the nose at 30 *knots* our 100-mph airplane will make a ground speed of 73 mph and the drift angle will be 14°. Again we are stubborn about the matter and in our computation of ground speed and drift, we substitute miles per hour for knots. The computer will show our ground speed as 77 mph and the drift angle 12°. This time the error is 4 mph in ground speed, 2° in the drift angle.

Now there are plenty of cases where a precise job of navigation is necessary, and certainly we should not, in such cases, advocate the assumption that the knot and the mile per hour are equal. It is fairly certain, however, that to the average private pilot this change is of no particular significance. Few of us attempt to navigate with such precision. Too, we should remember that there is some error in observations of wind speeds in the upper air and that the upper winds are continuously subject to change. Also, we might note that except when we have a direct head or tail wind, the faster our airplane the smaller the error in the ground speed and drift computation introduced by our assuming the knot and the mile per hour to be equal. Now if you own a computer directly calibrated to make the conversions of knots to miles and vice versa (and you know how to use it), you might as well disregard all the above discussion on substituting miles per hour for knots. But in case you are going to substitute miles per hour for knots, no correction, here are a couple of rules of thumb:

1. Because of this assumption, with a *helping* wind you'll gain a little over the computed ground speed and with a *hindering* wind you will lose a little over the computed ground speed.
2. Because of the assumption, your drift angles will be a little greater than computed.

Surface winds, incidentally, are still reported in miles per hour.

Just another comment about the knot. Do not use the expression "knots per hour" (as the writer has been guilty of doing). The knot is a unit of speed—not distance. Of the knot, Webster says: "A unit of speed, equivalent to one nautical miles (6,082.2 feet) per hour."

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Flying the HRP-1

(Continued from page 27)

hoist mounted above the main entrance door. The system is designed to lift or lower 400 pounds a distance of 100 feet. This hoist is particularly necessary for rescue work in retrieving personnel when operations over water or wooded terrain make it impossible to land the 'copter.

The HRP-1 is powered by a single Pratt and Whitney 600-hp engine which drives two 41-foot diameter, three-bladed rotors through a system of transmissions and drive shafts. The basic structure of the fuselage is steel tube, fabric and metal-covered, with a fixed tricycle landing gear. It will normally carry one ton of useful load consisting of fuel, a crew of two, and eight passengers or cargo. High speed is 110 mph, cruising speed is 85 mph and service ceiling is 10,000 feet. The rate of climb at best air speed of 55 mph is 850 feet per minute and vertical climb at zero air speed is 425 feet per minute.

Although the tandem configuration as used in the HRP-1 (with rotors at each end of the fuselage) is unique in design and appearance, the machine operates in the same manner aerodynamically as the conventional single main-rotor type. The tandem configuration permits full utilization of the central portion of the fuselage for cargo or passengers and eliminates the balance problem usually encountered in single-rotor helicopters. Another advantage claimed is that because of the contra-rotating rotors the necessity for the anti-torque rotor as required in single-rotor machines is eliminated. This allows an additional 10 per cent of engine power to be used for direct lift thereby giving the HRP-1 greater efficiency.

While considerably larger than most current service helicopters, the HRP-1 is controlled in flight with the same controls and in a similar manner as the smaller machines. There are four major flight controls and they perform the following functions:

Collective pitch control—Operated with the left hand, its movement changes the pitch of all six rotor blades simultaneously on both rotors through a range of 13 degrees. When the control is in the *down* position, the blades are in minimum pitch; when the control is in the *up* position, the blades are in maximum pitch.

Throttle control—This control is a quadrant-type throttle also operated by the left hand. Sliding the quadrant forward, opens the throttle; sliding it rearward, closes the throttle. To alleviate the necessity for constantly moving the throttle as the collective pitch control is operated (thereby changing power requirements), the throttle is partially synchronized with the collective-pitch control so that an increase in pitch will automatically provide an increase in manifold pressure. However, operation of the collective pitch over a wide range will normally require the pilot to make additional adjustment of the throttle to maintain desired engine rpm.

Rudder control—The rudder pedals are similar to those in fixed-wing aircraft and, when displaced, tilt the plane of rotation of the rotors (a plane formed by the average tip path of the blades), laterally in opposite directions. This introduces a force which turns the fuselage.

Cyclic control stick—This control is similar to the stick in small fixed-wing aircraft. Horizontal flight, whether forward, rearward or sidewise, is accomplished by the displacement of this control. Its action is to aerodynamically tilt the plane of rotation of both rotors so as to produce a thrust vector in the direction in which the stick is displaced. At low air speeds this control is purely for control of the horizontal movement of the helicopter. At speeds of over 20 mph, its action is very similar to that of a conventional fixed-wing aircraft. For example, pulling the stick back will cause the nose to rise and the helicopter to climb provided sufficient power is being utilized which is governed by the setting of the collective pitch control.

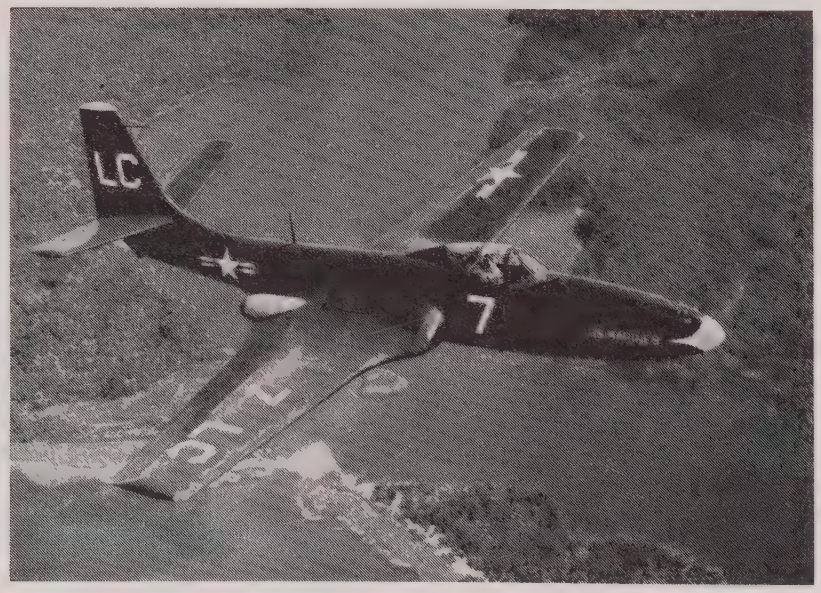
A mechanism peculiar to helicopters is the clutch. It would be too severe a strain on the rotors and rotor-drive system to start the engine with the rotor-drive system engaged. The engine is started in the conventional manner and, when running smoothly by means of a clutch incorporated in the drive system, the rotors are brought slowly up to speed. In the smaller helicopters a centrifugal clutch usually is used. This is brought into operation by simply increasing the engine rpm. In the case of the HRP-1, however, there is a manually operated clutch controlled by means of a lever located in the cockpit.

Contrary to popular conception, the rotors on helicopters in flight are rotated at almost constant rpm. Also, altitude is not controlled by increasing or decreasing throttle but rather by maintaining constant rotor rpm and controlling lift (altitude) by varying the pitch of the rotor blades by use of collective stick. Because of its size, control forces are slightly higher in the HRP-1 than in the smaller machines but the operation of its controls produces exactly the same results. Due to the contra-rotating rotors, torque reaction is not pronounced and the HRP-1 does not require the rudder compensation for changes in the engine power that is necessary in the single-rotor machines.

Vertical flight in the HRP-1 is effected once the rotor rpm has been brought up to the required speed, by simply raising the collective pitch control. The higher the control is raised, the more power the engine is delivering to the rotors and the faster will be the vertical rate of climb. However, the rudder and cyclic controls must be coordinated to control horizontal flight and to maintain the desired heading. The HRP-1 is capable of climbing vertically to 4,000 feet. However, in performing normal take-offs the helicopter is climbed vertically just enough to clear surrounding objects and then, by use of the cyclic control, accelerated forward to 55 mph which speed gives the best rate of climb. Once forward speed has been attained the helicopter is controlled in the same manner as a fixed-wing aircraft—by use of rudder and cyclic control alone. If, however, it is desired to make a rapid descent or climb, the collective control must also be employed.

It is neither safe nor practical to make a long vertical descent when landing this helicopter. Usually, if the terrain and landing area allows, a speed of 55 mph is maintained in the initial descent. This

(Continued on page 62)



Jet Training

A Marine Reserve pilot of Marine Reserve Fighter Squadron 132 from Floyd Bennett Field, Brooklyn, N. Y., is shown here at the controls of an FH-1 *Phantom* during a training flight. One pilot from each reserve squadron is checked out in jet aircraft so that he in turn can indoctrinate other reserve pilots when jet planes are received by Reserves in greater quantity.

Pilot's Report . . . Cub

(Continued from page 22)

took off from there. Since XB-FAG was a completely stock airplane without radio, we made a full circle on the ground to make sure there was no other traffic on this little dirt runway. Then we poured on the power.

While most airplanes huff and puff while picking up flying speed at these high altitudes, this little *Cub* "90" went right to work and hopped into the air with a surprisingly short run.

Mr. Centeno has a trade-mark that he says helps him sell Piper *Cubs* in Mexico, but it might get him in trouble with Stateside CAA officials. His flying trademark consists of an extremely steep climb just as soon as the ship leaves the ground. As the air speed falls past the 40-mph mark, Mr. Centeno comes forward on the controls and the *Cub* mushes back into level flight.

"As soon as they see the pull-up, they know it's a Piper," grinned Centeno as we wiped the perspiration from our brow.

We climbed out away from the busy airline terminal and flew over the "snail," a huge circular dry lake bed and evaporating plant just to the northeast of the field. This landmark is the last checkpoint before reaching Mexico City on flights from Brownsville and Laredo, Texas.

The little *Cub* climbed well in spite of the altitude. Holding a throttle setting of 2200 rpm, our rate-of-climb in rough air was about 750 feet per minute. The surface wind was gusty and sheets of dust drifted busily from the dry lake bed.

Since we had no contact with the tower, we headed across town to shoot a couple of landings at the Aero Club Campestre field, a sod strip on a knoll near the beautiful Hippodromo race track. The elevation here is 7,600 feet.

Before coming in for a landing, we snapped on the carburetor heat and tried a couple of stalls. The *Cub* "90" is one of the most docile ships in the air today when it comes to power-off stalls. There is plenty of control to obtain a clean-breaking stall, plenty of warning just before the stall with a good, solid tail-buffet, and plenty of tail surface to break the stall quickly. The air speed was under 40 mph when the little ship paid off.

We circled the Aero Club field and came in for a landing. As usual, our first pass was about 15 mph too fast. We came in on a low approach for this humpbacked airport and floated up the inclined end of the strip before touching down. This *Cub* lands just like the older models in spite of the slightly heavier engine. If anything, the later model will float farther than its predecessor since the landing gear and struts have been cleaned up to reduce drag and add speed.

Since the control system of the *Cub* is basically a cable and pulley arrangement, all new Pipers are set-up with tight controls. XB-FAG was no exception. It took very definite stick pressures to make the ship react. However, the control cables will have seated themselves into the fiber pulleys by the time a hundred hours is

(Continued on page 64)

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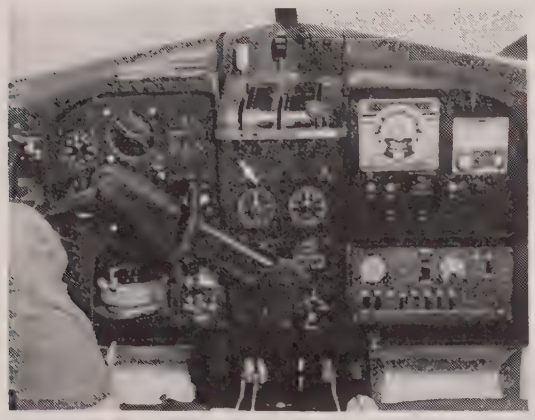
EAGER BEAVER



PANEL on the *Beaver* includes standard instrument group. Flight dials are in front; engine, in center

THE new de Havilland *Beaver* is a sturdy, rugged airplane designed to survive continuous hard use under Canada's most strenuous operating conditions. Although built primarily for Canada's bush pilots, this transport will have many applications within the United States. Powered by a Pratt and Whitney *Wasp Junior*, the *Beaver* can operate as landplane, seaplane or ski-plane. It has ranges varying from 200 to 578 miles, and its amazing take-off and climb performance with full load makes it an ideal airplane for commercial operations.

BATTERIES are on a tray mounted on sliding rail on the port side of the fuselage

SKIPLANE version of the *Beaver* is fitted with skis with brass runners. Shock absorbing ski pedestals give the plane smooth riding qualities even on rough snow, ice

DE HAVILLAND *Beaver* is licensed for operation as a landplane, seaplane or on skis. Its three fuel tanks are filled from port side *(below)*. Tanks hold 87 U.S. gallons

Holiday on Wings

(Continued from page 54)

Servicio hangar. In a few minutes, they had the *Bonanza* up on the jacks and a mechanic had spotted the trouble.

The trouble, it seems, was caused by too many small rocks picked up by the prop in getting in and out of the small Mexican airfields. Within a very short time, however, the mech had everything fixed and we were ready to shove off.

It was just one o'clock when we climbed back into the busy skies above the Mexico City airport and headed over the mountains at Actopan. If my first mistake was that uneasy take-off from the small field at Victoria, my second mistake was to try to get over the mountains at Actopan in the afternoon. Any Mexican pilot would have known better. We hit the most terrific winds, down drafts, up drafts, side drafts, cross drafts—any drafts you can name we hit. When a great big ominous looking cloud loomed up ahead of us . . . and one that was definitely hard-centered, we decided we'd had it for that day, so high-tailed it back to Mexico City.

We stayed over night and went out for another go at it the next morning. The air was a little rough, but nothing like it had been the previous afternoon. I certainly learned that if you want to do any flying in Mexico you have to get it in the morning and not wait until afternoon. We went up over the cloud layer at Actopan . . . and over the highest peak at 13,000 feet. My flight plan had called for 11,000 feet, but 14,000 seemed mighty low to me. Spotting a hole in the cloud just beyond Actopan, we went down through on a steady descent to Tamuin. I called the boys on 3105, but couldn't raise them, so we went on to Tampico where we stopped for gas and some lunch. Leaving there, we flew up the coast with a swell tail wind. We came into Brownsville at a little after 4 o'clock in the afternoon.

The tower had us taxi to the quarantine circle where a man with a flit gun came out and sprayed the inside of the *Bonanza's* cabin and us. We sat in the horrible stuff for at least 5 minutes. But despite it, it sure was good to get back on American soil.

By 5 o'clock we'd cleared everything and were free to go our way. A fiesta of some sort in Brownsville had caused a shortage of hotel space, so the gas man at the field suggested we fly over to Alice, Texas, where a large airport and hotel rooms probably would be available.

We flew the 140 miles in 50 minutes, passing right over the center of the King Ranch, and were able to get a nice room at the hotel there.

The rest of the trip back home to Hibbing, Minnesota, was uneventful and passed all too quickly. But in the *Bonanza* there's no other way, and so after a day's flying, we set our little personal airliner down on the still-icy runway at Hibbing.

We were home again. We had flown a distance of 5,760 miles; our flying time, 41 hours, 10 minutes; and our cost including gas, oil, and repairs, just 2½ cents a mile.

Sure, it was swell to get back home again after a trip like that . . . but now we're busy planning another one.

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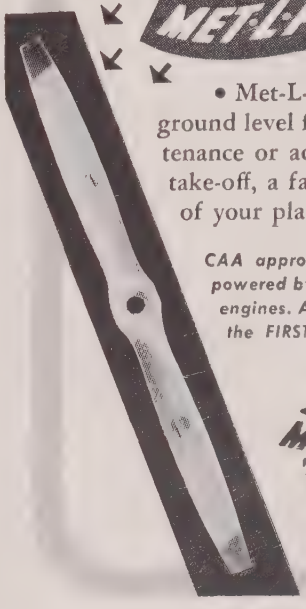

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(Continued on page 62)

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(Continued from page 61)

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Flying the HRP-1

(Continued from page 56)

will be gradually reduced until zero airspeed is reached directly over the intended landing area at an altitude not exceeding 30 feet. A vertical descent is then initiated until a landing has been effected. If sufficient rotor rpm is maintained, this helicopter will not stall under any conditions. However, considering the possibility of engine failure, it is not considered good practice to hover between 30 and 500 feet. This is avoided when possible due to the difficulty of selecting an emergency landing area and the hard landing that would normally result.

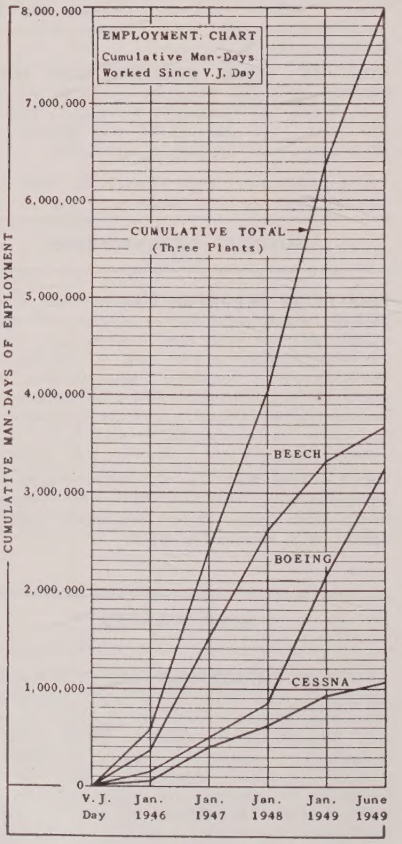
Before a pilot may solo the HRP-1, he must demonstrate his ability to make safe power-off descents. Voluntary and emergency autorotative descents are made in the HRP-1 by reducing the collective pitch to the minimum setting. Full directional and speed control is retained during this maneuver and, if sufficient altitude is available, a suitable landing area in the immediate vicinity can be selected. At 50 mph, the helicopter will descend in autorotation at 1,200 feet per minute. At zero air speed the rate of descent is 1,800 feet per minute. Two types of power-off landings may be accomplished, these being the running landing and the flared landing. The running landing, used when a hard, clear surface is available, is accomplished this way:

As the ground is approached (approximately 75 feet) the cyclic control stick is brought rearward slowly causing the flight path to flatten. A gradual reduction in air speed will accompany this maneuver. At the same time, collective pitch is increased gradually to lessen rate of descent. By the time the helicopter has slowed to 25 mph, the wheels should be on the ground. The helicopter can be brought to a rapid stop by continued application of rearward cyclic stick and the use of the wheel brakes.

In the flared-type landing, which is used where making an emergency landing over water, forests or rough terrain, a cyclic flare as in the above case is started. The flare is more positive so that forward speed is reduced to approximately zero immediately above the landing area. As the helicopter begins to settle at the end of the flare, the collective pitch is increased rapidly to make contact with terra firma as gentle as possible.

All pilots flying the HRP-1 have been thoroughly qualified as helicopter pilots in the smaller training types. Aside from the heavier control forces and greater weight of the machine, the HRP-1 is not more difficult to fly than the smaller helicopters. Its excellent rudder control enables it to hover without regard to wind direction, which is of great value when operating in confined quarters or aboard ship. The maneuverability of the HRP-1 is exemplified by its ability to fly sideways at 35 mph and backwards at 40 mph.

Morrison Reports on Employment



FOLLOWING a report that business leaders in Wichita, Kansas, viewed with "rising concern" a report of deeper slashes in military appropriations which, the leaders felt, would have a direct bearing on the economic stability of that region, SKYWAYS refers to a speech made by John Morrison, Director of Kansas Employment Security Division, to refute this "concern." Mr. Morrison points out that Wichita, one of the leading aircraft manufacturing cities in the world, is also one of the most prosperous.

During the war, Mr. Morrison recalls, many business leaders felt that the resultant inflation in employment in aircraft factories would lead to mass unemployment, a surplus of housing facilities and a general depressed condition after the war. This has not been the case, and to substantiate his claim he offers the accompanying employment chart which indicates the continuance of employment in Wichita's aircraft industry.

As of May 1949, the total number of aircraft workers in the Wichita area was 14,150 . . . or 57 per cent of the total workers employed in that area.

Much of the credit for that employment prosperity must be given to Beech, Cessna and Boeing.

(Continued from page 36)

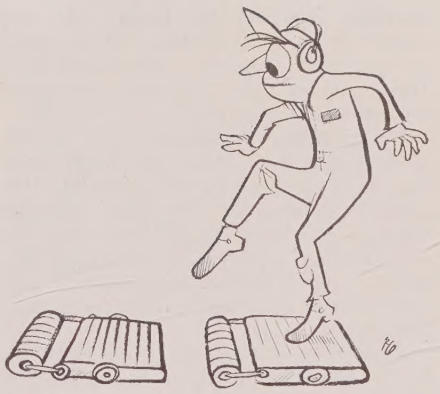
up his mind to land. By using a little of it, he might have located an airport. Certainly he could have found a better place to land than the field he used. At least he should have dragged it once, to look it over carefully.

Mistakes in aviation are costly.

Simulated Emergencies—Case 1. During a simulated emergency, the airplane was allowed to descend to such a low altitude that, when recovery was attempted, the plane struck a high tension wire at the end of the clearing.

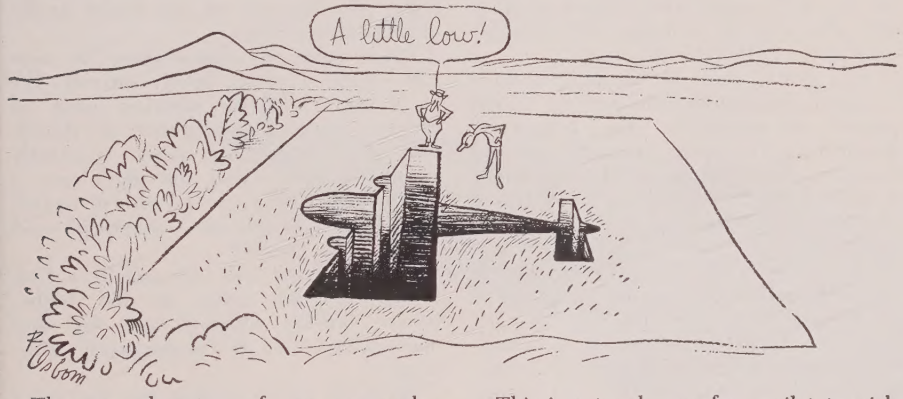
From Student's Statement: "My instructor was instructing me in simulated forced landings and proceeded to demonstrate one in a small clearing near the river. After getting in position to land, he gave it throttle and started out. I did not see the wire until we hit, and do not think the instructor did either."

Case 2. During a simulated emergency, the airplane was permitted to glide to a low altitude over a plowed field. Apparently the throttle was applied too rapidly, causing the engine to choke up, and allowing the plane to touch the soft ground . . . X.



Watch Your Step—An experienced pilot (1,000 hours) approached for a landing. The Tee told him the wind was approximately 30 degrees to the left of the runway. All prepared, he made a nice crosswind landing. During the run-out, the plane naturally started to swerve into the wind, but he was ready for this, too, and slapped on opposite brake.

It sounds as though this guy knew all the answers, doesn't it? But he still got in trouble. When he stepped on the brake, his foot slipped and edged into the opening at the top of the pedal. Before he could extricate it, the plane had ground-looped and nosed up.



These are but two of many examples of misplaced kindness on the part of some instructors who put both themselves and their students in unnecessary jeopardy. The "kindness" consists in attempting to give their students the most realistic emergencies possible; "misplaced" because too often engines which have cooled off in the glide, fail to respond when throttles suddenly are jammed wide open.

Simulated emergencies over open terrain are for the purpose of testing the student's reaction in an emergency, and to determine: a. His judgment in selecting correct wind direction; b. His technique in keeping the airplane at a safe gliding speed and attitude; c. His judgment in planning a good approach. Any good instructor knows that he can determine these essential points about his student long before the airplane is in the landing attitude.

The final question, of course, is whether the student can make a satisfactory landing *after* a simulated emergency. Naturally, the only way to determine this is to start the manuever over or near some designated small field where the landing actually may be completed, at the discretion of the instructor.

This is a tough way for a pilot to pick up more experience, but the sole of his shoe was covered with grease which he had stepped in shortly before entering the cockpit. A friend of mine did the same thing once and slipped off a wing. Had to eat standing up for a week.

Keep The Stick Back—Numerous minor accidents occur with a background that goes something like this one: "The pilot taxied out for take-off, turned to a cross-wind position, checked mags, and then revved up for a power check. During this check, his tail left the ground and his prop hit the runway."

Sounds silly, doesn't it; especially when considered in connection with the high replacement cost of props. At the risk of being tiresome, I'm going to repeat something we all learned back in primary flight training. It may save someone loss of face, which follows this sort of boob trick; likewise, the aforementioned loss of pocketbook.

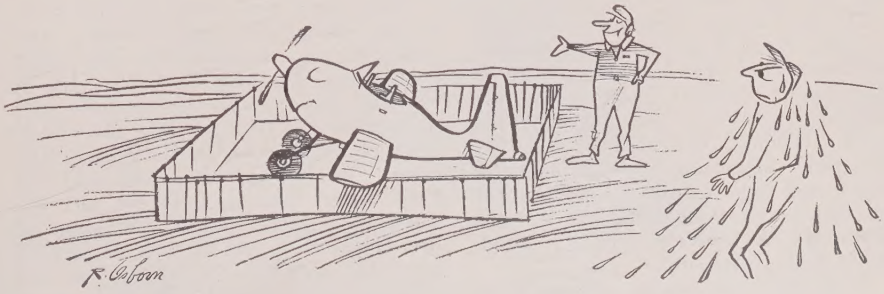
"Before checking mags, turn as nearly as possible *into* the wind. Look behind to make sure your slipstream won't embarrass anybody else. When you turn up, *hold the stick all the way back.* If the tail starts to rise, reduce throttle immediately and, if there is room ahead, release brakes sufficently to allow plane to roll forward a few feet."

A Student's Dream—Here's an old one some of you younger pilots may not have heard. A student on his third solo flight suddenly realized he was lost. After flying around for awhile without recognizing any landmarks, he decided to play it safe. He made a good landing in a small field near a farm house, and asked permission to use the phone.

He called his home field, told the Chief Instructor where he had landed and apologized for being late. That worthy, upon learning there had been no engine trouble and that the student had landed in a nice smooth pasture, told the student that his course home was 140 degrees.

About 20 minutes later, the student had the Chief on the phone again. "Say, no wonder I'm lost. The compass on this plane is defective. I took off and tried to get on a compass heading of 140, but it wouldn't read above 36. What shall I do?"

The student was ordered to stay on the ground; an instructor would soon be out there to fly him home. When the instructor arrived, he took one look at the field where the student had made two successful landings and one take off, and let out a long low moan. The field was so small that he insisted on removing two fences before he would attempt take off.



Pilot's Report...Cub

(Continued from page 57)

recorded on the log books and a pilot will not need to use so much control pressure.

Good brakes and smooth-riding landing gear shocks make operation from unpaved strips like the Aero Club field a cinch. We turned into the wind and opened the throttle. The "90" was in the air before the throttle was fully open.

As we flew across this picturesque, sprawling capital, Mr. Centeno told of some back-country flying done in Mexico with these little *Cub Specials*. Since supervision is not so complete in isolated communities south of the border as it might be in the United States, overloading is a common practice. Mr. Centeno mentioned a customer who regularly flies two passengers in the back seat of a "90," plus himself, from a field only 2200 feet long that is situated 8,600 feet above sea level. It reminded us of an old nursery rime, "Rub-a-dub-dub, three men in a *Cub*."

No modifications are made on the *Cub* for this high-altitude flying. The ships are flown to Mexico and delivered without any adjustments on either carburetor or propeller. In a country where trained mechanics, together with the necessary machine shops, congregate in large towns, *Cub* owners cash-in on this "bug-free" product in which modifications have been made gradually and carefully tested before being put on the market.

Flying again in this little *Cub* trainer brought back a host of memories of our own early flying. We first soloed in one of these little *Cub* trainers in the days long before the CPT programs when flight training cost $3.50 per hour, dual or solo. That front seat looked just as empty to us as it does to any student on his first solo today. The airport where we first flew has long since been converted into a housing project and our instructor, then a 2nd Lieutenant in the Air Force reserves, is now a Lt. Colonel. But the little *Cub* is just about the same—only better.

The welded-steel, fabric-covered fuselage remains basically the same except that some of the members have been strengthened. The wings have the same type of all-metal ribs, but now use all-aluminum spars rather than spruce. The ailerons are of the Friez balanced type instead of the "barn-door" surfaces used on the early models.

A great deal of improvement has been made inside the cabin. The rear seat is full width and the front seat is larger. Long-legged instructors have spent many a miserable moment uncoiling themselves from the front seat of earlier models.

The two-section, horizontal *Cub* door has been retained because of its trouble-free construction. The factory recommends this door for aerial photography, the dropping of supplies, ease of loading and better visibility. Straight-ahead visibility has been improved by flattening the engine cowling slightly by putting the gas tank in the wing rather than in the pilot's lap. A one-piece plexiglas windshield helps materially.

Sheet aluminum is now used for cabin interiors, replacing the fabric that was always in need of patching. These metal cockpit liners make the controls and fuselage members easily accessible for maintenance and inspection.

By mounting the shock cords on the landing gear flat within streamlined housings, drag has been cut substantially. This general cleaning-up is most apparent when a pilot tries to slow the ship up on a landing approach. Each side of the landing gear is hinged independently and full balloon tires aid muddy or snowy field flying.

From 1932 to 1936, the 37-hp E-2 *Cub* had a narrow landing gear with a tailskid and no brakes. Both tail surfaces and wings were square-tipped. Between 1936 and 1938, the J-2 *Cub* appeared with rounded tail and wing tips and a wider landing gear. The famed J-3, also known as the L-4, appeared late in 1938. A balanced rudder was introduced and mufflers were added. The PA-11 came along in 1948 with 90 horsepower and was built originally for agricultural dusting and spraying.

This new *Cub* is available from the factory as either a duster or a sprayer. The sprayer carries a 47-gallon belly tank between the landing gear vees with 24 vaporizing nozzles on pipes below each wing. All parts of the spraying equipment are located outside the cockpit so that the pilot may fly a helper with him as long as the belly-tank is empty.

As a duster, the *Cub* is equipped with a large hopper which can carry up to 500 pounds of insecticide. The hopper is installed in the space normally utilized by the rear seat and dust is loaded through a hatch in the center section. Art Whitaker of Portland, Oregon, did the design work and builds these units for Piper.

The air over Mexico City was smooth and just cool enough so that a jacket felt comfortable with the side of the *Cub* open. We circled lazily over town, shooting pictures of the broad "avenidas" and modernistic architecture. This *Cub* trainer is the ideal camera ship, not only because of the near-perfect visibility with the doors open, but also because the ship has tandem seating and a pilot can fly more-or-less by the "seat of his pants," using only the rudder pedals and an occasional knee pressure on the stick while taking pictures.

The gas gauge, a visual lucite tube high on the left side of the wingroot, was flirting with the "empty" mark as we headed back toward the municipal airport. The late-afternoon wind had picked up noticeably and dust was blowing off the airport. We had to "crab" almost 45 degrees on our base leg to keep from being blown away from the airport.

When you haven't made a wheel landing in a lightplane equipped with a conventional gear for months, you can expect a little hop, skip and jump. We came in low and fast over the adobe huts near the airport and tried to paste the wheels down on the short end of the runway. We missed our timing just a little and the *Cub* started back up into the air. We eased on a little throttle and began all over again with just a touch of forward stick. After a couple of dribbles, we had XB-FAG firmly planted on the runway with its tail high in the air. By adding a little power, we taxied tail-high toward the hangar.

As we stopped, Mr. Centeno asked if we wanted to make a couple of pictures of his "trade-mark" take-off. It was nearly dark, but we unstopped the lens of our Speed Graphic to wide open and nodded.

Mr. Centeno taxied a little way down the runway and turned into the wind. He opened the throttle and the *Cub* hopped into the air within 100 feet. As soon as the wheels cleared the ground, the Mexican salesman came back on the stick. The *Cub* "90" zoomed up at an incredibly steep angle and mushed level at about 100 feet. Of course the airplane was lightly loaded with only a pilot and a minimum of fuel, but this type of performance is absolutely spectacular when compared with the long, laboring take-off roll of many aircraft in this rarified air.

We heaved a sigh of relief as the salesman came in for a smooth landing and taxied the ship up to the hangar between the maguey plants. That's one way to sell airplanes, and judging from the number of *Cubs* in the Mexico City area, it must payoff south of the border.

Mr. Centeno then drove around the airport to close his local flight plan. All flights within the 25-mile control area of the Mexico City airport must be on a flight plan because of the heavy traffic of scheduled airliners.

Piper makes no claims about his new "90" being a plush, family aircraft. It's a working airplane, whether used as trainer, photo ship, sprayer or duster. This little ship has been constantly improved since 1932 and there are a minimum of "bugs" in the present model, both from a maintenance standpoint and that of pilot comfort.

Almost anyone can buy and fly a *Cub* trainer without being in the higher income bracket. Original cost, fuel and maintenance are all comparatively inexpensive.

All in all, it's an airplane that you don't have to worry about—and it'll pay off with a lot of fun.

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